

CHAPTER 16

CONSTRUCTION SPECIFICATIONS

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CHAPTER 16 CONSTRUCTION SPECIFICATIONS

16.0 INTRODUCTION

This chapter defines Standard Specifications and Special Provisions. It provides details on the format and guidelines for writing Special Provisions, and describes the approval process for both Standard and Project Special Provisions.

16.1 SPECIFICATIONS - GENERAL

16.1.1 Definition

“Specifications” is a general term applying to all directions, provisions, and requirements pertaining to the performance of the work and payment for the work.

16.1.2 Importance and Characteristics of Well-Written Specifications

Well-written specifications are essential to the efficient construction of a successful project. Well-written specifications inform the Contractor of the work to be performed, the conditions and restrictions on performance of the work, the expected quality of the work, and the manner in which the work will be measured for payment.

With the increased complexity and specialization in modern construction and the need for the Project Engineer to focus on legal requirements and administration, use of the phrase “as directed by the Engineer” should be minimized. Work requirements must be clearly stated in the specifications.

Well-written specifications:

- are clear, concise, and technically correct.
- do not use ambiguous words that could lead to misinterpretation.
- are written using simple words in short, easy to understand sentences.
- use technically correct terms, not slang or “field” words.
- avoid conflicting requirements.
- do not repeat requirements stated elsewhere in the Contract.
- do not explain or provide reasons for a requirement.
- state construction requirements sequentially.
- avoid the use of ambiguous phrases such as “and/or” and “him/her.” Rewriting the sentence can eliminate such phrases.

Furthermore, the phrases “approved by the Engineer” or “accepted by the Engineer” should be avoided. These should be used only when the Engineer will actually accept or approve the work. In such phrases, “approved” and “accepted” are synonymous; there is no difference in the responsibility taken by the Engineer.

16.1.3 Basic Specification Policy

Some of CDOT's established policies for the development and use of construction specifications are described below. These policies are based on Federal and State laws and regulations, CDOT Policy and Procedural Directives, directions from the Chief Engineer, and established CDOT practice.

16.1.3.1 Standards and Specifications Unit

The Standards and Specifications Unit in the CDOT Project Development Branch is charged with overseeing the development and implementation of construction specifications. This unit writes and revises the *CDOT Standard Specifications for Road and Bridge Construction (1)* (commonly called the *Standard Specifications*) and *CDOT Supplemental Specifications*, issues Standard Special Provisions, and prepares or reviews Project Special Provisions.

CDOT Procedural Directive 513.1 - Construction Project Specifications (2), states that the Standards and Specifications Unit is to review and approve all new Project Special Provisions and newly revised Project Special Provisions that contain significant changes, and initiate a formal review process when necessary. The Standards and Specifications Unit should be given at least two weeks to review proposed Project Special Provisions before they are incorporated into the construction project documents for advertisement.

The CDOT Specification Committee [described in *Procedural Directive 513.1 (2)*] assists the Standards and Specifications Unit with the review and development of formal specification changes that may be controversial or have a significant impact on the highway construction industry.

16.1.3.2 Liquidated Damages, Penalties, and Incentives

Do not use specifications that assess penalties to the Contractor. The only deductions that can be made from monies due the Contractor are:

- Liquidated damages based on additional engineering costs to the Department.
- Incentives and disincentives based on either the quality of the work or incurred road user costs.
- Price adjustments based on the quality of the work.

In each case, the deduction amount included in the specification must be accurately calculated and documented in the project file. Remediation specified for non-specification work should not be harsh or punitive, but should accurately represent the actual loss of value to the Department or to the road user.

16.1.3.3 Uniformity

CDOT strives to achieve statewide uniformity in the use and application of specifications. Frequent changes to specifications and differences in specifications from project to project and Region to Region lead to misinterpretation, inconsistent enforcement, higher bid prices, and Contractor claims. As much as possible, the *CDOT Standard Specifications for Road and Bridge Construction (1)*, Standard Special Provisions and formally issued sample Project Special Provisions and Special Provision Work Sheets should not be changed.

16.1.3.4 Warranties and Guaranties

In accordance with the *Code of Federal Regulations* [23 CFR Part 635.413] (3), warranties or guarantees are allowed on federal aid projects, however, their inclusion within the Contract must be limited to a “specific product or feature” and cannot “place an undue obligation on the Contractor for items or conditions over which the Contractor has no control.” Warranties for items of maintenance are not eligible for federal participation and will not be allowed. Allowing the use of a “General Warranty” by making the item non-participating is not an acceptable solution since this is viewed as circumventing the federal requirements. CDOT applies this policy to all projects including those that are not federally funded or are not on the NHS.

Warranties must be for a specific feature or product, and the specification must clearly define the performance indicators and the corrective action required. All warranty specifications shall be sent to the CDOT Standards & Specifications Unit for review and approval four weeks prior to inclusion in a project for advertisement.

16.1.3.5 Proprietary Items

The use of trade or brand names or the direct reference to patented or proprietary materials, specifications, or processes should be avoided in contracts. This applies to all projects, NHS and non-NHS, regardless of funding source. Generic construction specifications should be developed that will obtain the desired results as well as assure competition among equivalent materials or products. There are instances, however, where a particular proprietary product must be specified for use on a project.

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. A reasonable number would be to specify in the contract two or three equally suitable products and include the term “or approved equal”. Note that additional wording shall be added to the specifications to more clearly define the phrase “or approved equal.” An example of this is the following:

For an alternative material to be considered an approved equal, the product shall have been lab tested and field trialed by the National Transportation Product Evaluation Program (NTPEP) and approved by the Department’s Materials and Geotechnical Program. Information for the NTPEP evaluation program can be found at <http://www.ntpep.org/Pages/RSCPReports.aspx>

If a product is on the approved Finding in the Public Interest (FIPI) list it will be noted in the specification and the term “or approved equal” is not to be used. Also, if four or more products are specified, the term “or approved equal” should not be used and neither a FIPI or Certification is necessary. Therefore, when the use of a patented or proprietary (trade name) item is essential and only one item is to be specified in the Contract for synchronization reasons or if no equally suitable alternative exists, then a Certification is necessary. However, if only one item is to be specified in the Contract when there are equally suitable products, or if two or three items without the phrase “or approved equal” are to be specified in the Contract, then a FIPI is necessary.

For more guidance on the use of proprietary items, including development of the certification or FIPI, refer to subsection 2.24.01 of the *Project Development Manual* (4).

16.1.3.6 Materials-Methods Vs. End-Result Specifications

Materials-methods and end-result are the two basic types of construction specifications. Materials-methods specifications describe in detail the materials, workmanship, and processes the Contractor is to use during construction. Materials-methods specifications restrain contractor innovation and obligate the owner to accept the work if the specified materials and processes are used. End-result specifications describe the desired result or quality of the final product to be achieved. End-result specifications encourage contractor innovation and allow the owner to accept or reject the final product. Current CDOT specifications include both types and, in some cases, a combination thereof. End-result specifications are preferred.

Process Control/Owner Acceptance (PC/OA) is a type of end-result specification. PC/OA specifications require the Contractor to perform all testing necessary for control of production while the owner (CDOT) performs the testing necessary to determine acceptance, rejection, or price adjustment of the product. Acceptance, rejection, or price adjustment is usually based on a statistical analysis of the test results. CDOT currently uses PC/OA specifications for pavements.

16.1.3.7 Pay Items

The specifications establish the pay items under which the Department will pay the Contractor for work completed. Readily identifiable and measurable items of work should not be made subsidiary to other items, but should be paid for under separate pay items. Use of lump sum pay items should be minimized. Pay items with subsidiary items and lump sum pay items are difficult for contractors to bid and difficult for the Project Engineer to administer during construction, especially in cases of changed conditions or changed quantities.

Payment for work by force account should be minimized. Force account work involves additional paperwork and often has a higher cost than if the work had been paid for under a bid item.

16.1.3.8 Reference Specifications

AASHTO (American Association of State Highway and Transportation Officials) is the preferred reference for citations. Other national standard references such as ASTM (American Society for Testing and Materials) may be used when there is no AASHTO specification available.

16.1.3.9 Laws, Statutes, and Regulations

Subsection 107.01 of the *CDOT Standard Specifications for Road and Bridge Construction (1)* requires the Contractor to be fully informed of, and comply with, all applicable laws and regulations. Generally, specifications that apply, interpret, or enforce laws and regulations should not be used.

16.2 STANDARD SPECIFICATIONS

Work on CDOT construction projects is controlled by the *CDOT Standard Specifications for Road and Bridge Construction (1)*. Except where necessary when citing reference specifications (see section 16.1.3.8), the *CDOT Standard Specifications for Road and Bridge Construction (1)* contain only English units of measure. See section 16.6.

16.2.1 Organization and Format

The *CDOT Standard Specifications for Road and Bridge Construction (1)* are organized into numbered Sections. Sections 101 through 109 contain General Provisions dealing with contracting procedures, general and legal responsibilities of the Contractor, prosecution of the work, control of work and materials, and measurement and payment for the work. Sections 201 through 641 contain construction details, and Sections 701 through 717 contain materials details.

16.2.1.1 Five-Part Format

Each Section of the construction details, Sections 201 through 641, is organized into the following five parts, in the following order:

DESCRIPTION

This part consists of short, succinct statements summarizing the work covered by this Section of the *CDOT Standard Specifications for Road and Bridge Construction (1)*. The Description should not contain details, materials or construction requirements, or explanations of measurement and payment.

MATERIALS

This part either specifies the materials requirements the work of this section must meet or refers to subsections in the Materials Details Sections (701 through 717) that contain those requirements.

CONSTRUCTION REQUIREMENTS

This part consists of the required construction procedures or end results of the work to be performed under this Section of the *CDOT Standard Specifications for Road and Bridge Construction (1)*. Specific construction details are specified in this part.

METHOD OF MEASUREMENT

This part describes the methods and the units by which the work under this Section of the *CDOT Standard Specifications for Road and Bridge Construction (1)* will be measured for payment to the Contractor.

BASIS OF PAYMENT

This part establishes the pay items for work accomplished under this Section of the *CDOT Standard Specifications for Road and Bridge Construction (1)* and, when necessary, explains what is included in the payment for those pay items.

16.2.1.2 Subsections

The text of the *CDOT Standard Specifications for Road and Bridge Construction (1)* is organized into decimal subsections running consecutively through each Section (the parts are listed in 16.2.1.1). The first subsection is xxx.01, the second xxx.02, etc., where xxx is the Section number.

Subsections are broken into smaller parts ordered by consecutive numerical or alphabetical characters and indented as shown in Figure 16-1.

Numbers in parentheses are also used to identify items in a list, regardless of the placement of the list within the subsection.

See *Figure 16-1, Subsection Organization*, below for an example.

16.3 SUPPLEMENTAL SPECIFICATIONS

Supplemental Specifications are additions and revisions to the *CDOT Standard Specifications for Road and Bridge Construction (1)* that are formally adopted subsequent to the issuance of the printed book. Supplemental Specifications apply to all CDOT construction projects in the same manner as the *CDOT Standard Specifications for Road and Bridge Construction (1)*. The Contract will clearly identify when Supplemental Specifications are in effect.

16.4 SPECIAL PROVISIONS

Special provisions are additions and revisions to the *Standard and Supplemental Specifications* covering conditions unique to an individual project or group of projects. Special provisions apply to a particular construction project only when included in the Contract for that project. Special provisions fall into one of two categories: Standard Special Provisions or Project Special Provisions. Special provisions are developed and implemented according to *Procedural Directive 513.1, Construction Project Specifications (2)*.

16.4.1 Organization of Text

The revised or added specification text should be organized under each heading according to the conventions used in the *CDOT Standard Specifications for Road and Bridge Construction (1)*.

16.4.2 Margins

The margins used in Special Provisions are 0.75 inch for left and right and 0.5 inch for top and bottom.

16.4.3 Text

Bold and italicized characters should not be used in the body of the text to emphasize or draw attention to a particular requirement. Underlining is not used in the *CDOT Standard Specifications for Road and Bridge Construction (1)* and should not be used in Special Provisions.

Titles preceded by (a), (b), etc. should be italicized (see Figure 16-1).

Text should be bold where it would be in the *CDOT Standard Specifications for Road and Bridge Construction (1)*. Such locations include section headings, subsection numbers, subsection titles, and table headings.

16.4.4 Standard Special Provisions

Standard Special Provisions are additions and revisions to the Standard and Supplemental Specifications, which are unique to a selected group of projects or are intended for temporary use. Standard Special Provisions are dated and formally issued by the CDOT Project Development Branch with specific instructions for their use. They are to be used without modification. The Standards and Specifications Unit of the Project Development Branch should be contacted if a project has special circumstances that may require modification of a Standard Special Provision.

16.4.4.1 Fonts

The font used for Standard Special Provisions is 10-point Arial.

16.4.5 Project Special Provisions

Project Special Provisions are additions and revisions to the *CDOT Standard Specifications for Road and Bridge Construction (1)* and Supplemental Specifications unique to a particular project. The writing style used for Project Special Provisions should be consistent and uniform.

16.4.5.1 Criteria

- Write a Project Special Provision only if the subject has not been adequately covered in the plans, CDOT Standard Specifications for Road and Bridge Construction (1), or Standard Special Provisions.
- Write clear, enforceable requirements that will be interpreted the same way by both the Engineer and the Contractor.
- State the correct pay items. The name of the pay item must be consistent throughout the plans, specifications, and estimate. If the bid item is not listed in the current CDOT Item Book, the Project Manager should contact the Engineering Estimates and Market Analysis Unit and the Standards and Specifications Unit.
- Make sure that Project Special Provisions do not conflict with other parts of the plans and specifications.
- Use end-result rather than materials-methods requirements where possible.
- Specify a requirement; don't make a suggestion or give an explanation.
- Use the verb "will" when stating actions that will be taken by CDOT and "shall" when the action is to be taken by the Contractor. For example, see the following statements in subsection 108.03 of the CDOT Standard Specifications for Road and Bridge Construction (1) regarding the project schedule:
 - "The Project Schedule shall show all activities required by all parties to complete the work." [Contractor's responsibility]
 - "The Engineer's review of the schedule will not exceed 10 calendar days." [Engineer's responsibility]
- See the following statements in subsection 601.05:
 - "Except for Class BZ concrete, the slump of the delivered concrete shall be the slump of the approved concrete mix design plus or minus 2.0 inches." [Contractor's responsibility]
 - "Acceptance will be based solely on the test results of concrete placed on the project." [Engineer's responsibility]
- Use the appropriate Standard Special Provisions as written; don't write a Project Special Provision that covers the same issue without consulting the Standards and Specifications Unit.
- Don't use Project Special Provisions with guaranty or warranty clauses unless they fall within the guidelines described in the *Code of Federal Regulations* 23 CFR Part 635.413 (3). Check with the Standards and Specifications Unit to ascertain if policies and procedures have been implemented pertaining to the use of the warranty provision. See section 16.1.3.4.
- Don't use proprietary items except as outlined in section 16.1.3.5.

16.4.5.2 Format and Style

Project Special Provisions should conform to the conventions used in the *CDOT Standard Specifications for Road and Bridge Construction (1)*. See the examples for each type described in section 16.4.5.5.

16.4.5.3 Fonts

The font used for Project Special Provisions is 11-point Times New Roman.

16.4.5.4 Titles

The title, capitalized and centered at the top of the page, should identify the section of the *CDOT Standard Specifications for Road and Bridge Construction (1)* being revised and the subject of the revision. On multiple page special provisions, the page number pertaining to the special provision should be centered on the first line of the title, on every page. Following is an example:

1
REVISION OF SECTION
105 CONTROL OF WORK

16.4.5.5 Types of Special Provisions

The basic types of special provisions are described below with an example following. Use the example headings, or a variation thereof, for the appropriate type of special provision (xxx represents the section number).

- **Type 1 - Revision of Various Subsections.** Begin a special provision that revises one or more subsections with the following heading:

Section xxx of the Standard Specifications is hereby revised for this project as follows:

Follow that statement with the appropriate one or more of the following headings, or variation thereof:

Subsection xxx.xx shall include the following:

Delete subsection xxx.xx and replace it with the following:

In subsection xxx.xx delete the nth paragraph and replace it with the following:

Subsection xxx.xx, nth paragraph shall include the following:

In subsection xxx.xx, nth paragraph, delete the nth sentence and replace it with the following:

When appropriate, follow each heading with the added or revised text.

Include related changes to separate parts of a section in a single special provision; e.g., when revising CONSTRUCTION REQUIREMENTS and the related MATERIALS part.

Example:

<p>REVISION OF SECTION 202 REMOVAL OF ASPHALT MAT</p>	
<p>Section 202 of the Standard Specifications is hereby revised for this project as follows:</p>	
<p>Subsection 202.01 shall include the following:</p>	
<p>This work includes removal and disposal of existing asphalt mat within the project limits as shown on the plans or at locations directed by the Engineer.</p>	
<p>In subsection 202.02 delete the seventh paragraph and replace with the following:</p>	
<p>The existing asphalt mat which varies in thickness from 2.5 inches to 6 inches shall be removed in a manner that minimizes contamination of the removed mat with underlying material. The removed mat shall become the property of the Contractor and shall be either disposed of outside the project site, or used in one or more of the following ways:</p>	
<ol style="list-style-type: none"> (1) Used in embankment construction in accordance with subsection 203.06. (2) Placed in bottom of fills as approved by the Engineer. (3) Recycled into the hot mix asphalt. (4) Placed in the subgrade soft spots as directed by the Engineer. 	
<p>Subsection 202.11 shall include the following:</p>	
<p>The removal of the existing asphalt mat will be measured by the square yard of mat removed to the required depth and accepted.</p>	
<p>Subsection 202.12 shall include the following:</p>	
<p>Payment will be made under:</p>	
<p>Pay Item</p> <p>Removal of Asphalt Mat</p>	<p>Pay Unit</p> <p>Square Yard</p>
<p>Unless otherwise specified in the Contract, the disposal of the asphalt mat or its use in other locations on the project will not be measured and paid for separately, but shall be included in the work.</p>	

- **Type 2 - Deletion and Replacement of an Entire Section.** Begin a special provision that deletes and replaces an entire Section with the following:

Section xxx of the Standard Specifications is hereby deleted for this project and replaced with the following:

Follow this statement with the revised text of the Section. Organize the text into the five main parts: DESCRIPTION, MATERIALS, CONSTRUCTION REQUIREMENTS, METHOD OF MEASUREMENT, and BASIS OF PAYMENT.

Example:

**REVISION OF SECTION
306 RECONDITIONING**

Section 306 of the Standard Specifications is hereby deleted for this project and replaced with the following:

DESCRIPTION

306.01 This work consists of ripping and pulverizing the existing asphalt mat, regrading and compacting the subgrade with moisture and density control, and placing the pulverized bituminous material as a modified base course atop the subgrade, in accordance with the specifications, at locations shown, and in conformity with the details shown on the plans or as staked.

CONSTRUCTION REQUIREMENTS

306.02 The existing mat shall be ripped, pulverized, and placed in windrows. The maximum particle size of the pulverized bituminous material shall be 1.5 inches.

The top 4.5 inches of the subgrade material shall then be removed and disposed of at the location designated on the plans. The top 6 inches of the remaining subgrade material shall be scarified, shaped, and compacted using moisture and density control. The subgrade surface shall not vary above or below the lines and grades staked by more than 1 inch. The surface will be tested prior to placement of the pulverized bituminous material.

The pulverized bituminous material shall then be placed as shown on the plans and compacted using moisture and density control.

METHOD OF MEASUREMENT

306.03 Reconditioning will be measured by the square yard of roadway treated, complete and accepted.

BASIS OF PAYMENT

306.04 The accepted quantities of reconditioning will be paid for at the contract unit price per square yard for reconditioning.

Payment will be made under:

Pay Item	Pay Unit
Reconditioning	Square Yard

Payment for reconditioning will be full compensation for all work necessary to complete the item including ripping and pulverizing the existing asphalt mat, excavation and disposal of subgrade material, scarifying and compacting the subgrade, placing and compacting the pulverized bituminous material, blading, shaping, haul, and water.

- **Type 3 - Addition of a New Section.** Begin a special provision that adds a new specification Section with the following:

Section xxx is hereby added to the Standard Specifications for this project as follows:

Follow this statement with the text of the new Section. Organize the text into the five main parts: DESCRIPTION, MATERIALS, CONSTRUCTION REQUIREMENTS, METHOD OF MEASUREMENT, and BASIS OF PAYMENT.

Example:

**SECTION 621
TEMPORARY BRIDGE**

Section 621 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

621.01 This item includes loading, transporting, erecting, maintaining, removing, and returning the temporary bridge.

MATERIALS

621.02 The temporary bridge is a Bailey Bridge in the possession of the Department. The Department will not charge a rental fee for the use of this bridge on this project.

CONSTRUCTION REQUIREMENTS

621.03 The Contractor shall load and return the temporary bridge at the following site:
[INSERT SPECIFIC LOCATION]

The Contractor shall make arrangements with Department maintenance personnel at least five days prior to the loading and returning dates.

The temporary bridge shall be erected at the location and in conformity with the lines and grades shown on the plans or established.

The Contractor shall replace all structural parts that are missing or damaged when the bridge is returned. The Contractor shall band all components together before returning the bridge for storage.

The Contractor shall return the temporary bridge within 30 days after the new structure is opened to traffic.

METHOD OF MEASUREMENT

621.04 Temporary Bridge will not be measured, but will be paid for on a lump sum basis.

BASIS OF PAYMENT

621.05 The completed and accepted work for the temporary bridge will be paid for at the contract lump sum price. This price shall include all labor, equipment, and materials required to load, transport, erect, maintain, remove, and return the temporary bridge.

Payment will be made under:

Pay Item	Pay Unit
Temporary Bridge	Lump Sum

- **Type 4 - Addition of Changes Not Tied to Specific Subsections.** Begin a special provision that adds text throughout the Section and that does not tie in well to the existing subsections (such as requirements for a new item or type of construction) with the following:

Section xxx is hereby revised for this project to include the following:

Follow this statement with the new text organized into the five main parts: DESCRIPTION, MATERIALS, CONSTRUCTION REQUIREMENTS, METHOD OF MEASUREMENT, and BASIS OF PAYMENT.

Special provision Type 1 is the preferred and most commonly used type of special provision. Samples of each type of special provision appear in subsection 16.8.

Example:

<p>REVISION OF SECTION 210 RESET IMPACT ATTENUATOR</p> <p>Section 210 of the Standard Specifications is hereby revised for this project to include the following:</p> <p style="text-align: center;">DESCRIPTION</p> <p>This work consists of resetting impact attenuators in accordance with these specifications and in conformity with the lines and details shown on the plans or established.</p> <p style="text-align: center;">MATERIALS</p> <p>The impact attenuators are the types shown at the various locations on the plans.</p> <p style="text-align: center;">CONSTRUCTION REQUIREMENTS</p> <p>The site shall be prepared to receive the reset impact attenuator by filling, excavating, smoothing and all other work necessary for the proper installation of the attenuator.</p> <p>The impact attenuator shall be installed in accordance with the manufacturer's recommendations.</p> <p style="text-align: center;">METHOD OF MEASUREMENT</p> <p>Reset impact attenuator will be measured by the number of attenuators as shown on plans, reset and accepted, including site preparation and all necessary hardware.</p> <p style="text-align: center;">BASIS OF PAYMENT</p> <p>The accepted quantities will be paid for at the contract unit price for the pay item listed below.</p> <p>Payment will be made under:</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; padding: 5px;">Pay Item</th> <th style="text-align: left; padding: 5px;">Pay Unit</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Reset Impact Attenuator</td> <td style="padding: 5px;">Each</td> </tr> </tbody> </table>		Pay Item	Pay Unit	Reset Impact Attenuator	Each
Pay Item	Pay Unit				
Reset Impact Attenuator	Each				

These are the most common types of special provisions; there are variations.

16.4.5.6 Revised or Added Specification Text

Special provisions revising any of the Sections 201 through 641 should be written so that the revised or added specification text is incorporated into the appropriate subsections under one or more of the five main parts. New main parts should not be established except in the rare instance of adding an item for design to be performed by the Contractor.

The organization used for the *CDOT Standard Specifications for Road and Bridge Construction (1)* should be followed for the added or revised text of Project Special Provisions. The part of the subsection being revised should be identified and the new or revised text should be made to fit that part. The text or breakdown character should start at the left margin and not be indented.

16.4.6 Use of New or Revised Project Special Provisions

New and newly revised Project Special Provisions that contain significant changes must be reviewed by the Standards and Specifications Unit in the Project Development Branch. These should be submitted electronically in the format described above and with sufficient review time (normally two weeks). The Project Manager should be prepared to explain the engineering or project management considerations that justify the use of the Project Special Provision.

The Standards and Specifications Unit will review the proposed special provision for conformance to CDOT policy and FHWA regulations, potential controversy, clarity, grammar, punctuation, and format. The Standards and Specifications Unit will respond with approval, suggested changes, or a statement that the special provision should not be used. When the Standards and Specifications Unit determines that a proposed special provision is controversial or addresses an issue with broad impact, it may initiate a more formal review process to be completed before the proposed special provision can be used on CDOT construction projects.

If the proposed Project Special Provision covers an issue that could have statewide implications, the Branch Manager or Region Transportation Director should request review by the appropriate CDOT Technical Committee or submit a Form 1215 - *Submittal of New Specification or Specification Change (8)* to the Standards and Specifications Unit.

16.4.7 Special Provision Package

The Contract documents for each CDOT construction project include a set of special provisions accompanying the plan sheets. This set of special provisions consists of an index of the Project Special Provisions and an index of the applicable Standard Special Provisions followed by the Project and Standard Special Provisions. The project manager inserts the Project Special Provisions listed on the index. CDOT has created a tool for putting the special provision package together. The tool and its instructions can be found on the CDOT website at: https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs/psp_specs_writing_program .

When preparing the special provision package for a project, the project number and code should be listed on the left and the date on the right at the top of each Project Special Provision page.

The page number should be centered at the bottom of each page. The Index and Project Special Provision pages should be numbered consecutively, beginning with Page 1.

16.5 CONSTRUCTION SPECIFICATIONS WEBSITE

The Standards and Specifications Unit maintains Special Provisions on the CDOT website.

16.5.1 Accessing the Website

The CDOT website address is <https://www.codot.gov>. The Specifications page on the CDOT website is located at <https://www.codot.gov/business/designsupport/cdot-construction-specifications>.

16.5.2 Contents of the Website

The Specifications page on the CDOT website contains:

- Standard Specifications Text
- Current Standard Special Provisions
- Project Special Provision Work Sheets
- Sample Project Special Provisions
- Materials Specifications Check List
- Design/Build Special Provisions
- Fuel Cost Adjustment
- Asphalt Cement Cost Adjustment
- Past Davis-Bacon Minimum Wage Decisions
- Innovative Contract Provisions
- Phased Funding Special Provisions
- Warranted HBP Special Provisions
- Significant Changes found in the *CDOT Standard Specifications for Road and Bridge Construction (1)*

The following information is also available:

- Creating a Special Provision Package for a CDOT Project
- Guidelines for Writing Construction Specifications (this document)
- Specification Changes Under Consideration

16.5.2.1 Project Special Provision Work Sheets

Work sheets available on the website include those for frequently used Project Special Provisions and instructions for index pages, Notice to Bidders, Commencement and Completion of Work, and Traffic Control Plan - General.

16.5.3 Updates

The Standards and Specifications Unit notifies users of updates to the website by e-mail.

16.6 USE OF METRIC AND ENGLISH UNITS

The *CDOT Standard Specifications for Road and Bridge Construction (1)* and Standard Special Provisions used with it contain only English units. Project Special Provisions should contain only English units, except where metric units are required to conform to reference specifications.

16.7 WRITING STYLE

Traditionally, specifications are written in the indicative mood, either active or passive voice.

- Active voice:

The Contractor shall place the aggregate to a depth of 6 inches and compact it to a density of 95 percent.

- Passive voice:

The aggregate shall be placed to a depth of 6 inches and compacted to a density of 95 percent.

Some states have rewritten their standard specifications in the imperative mood, active voice. This style of writing replaces the lengthy “the Contractor shall” sentences with short sentences giving direct instructions.

- Imperative mood, active voice:

Place the aggregate to a depth of 6 inches and compact it to a density of 95 percent.

However, CDOT has not adopted the imperative mood style in the *CDOT Standard Specifications for Road and Bridge Construction (1)*. The book is written in the indicative mood, either active voice (where possible) or passive voice (where necessary).

Special provisions should match the style of the *CDOT Standard Specifications for Road and Bridge Construction (1)*. In special provisions, use short simple sentences in the active voice wherever possible. Use the imperative mood only if it is preceded by an introductory statement clarifying that the text makes a requirement on the Contractor. An example that appears in subsection 209.05 of the *CDOT Standard Specifications for Road and Bridge Construction (1)* is the following:

Magnesium Chloride dust palliative shall be applied as follows:

- (1) Scarify the top 2 inches of the existing road surface and wet with water to approximately four percent moisture content, or as directed.
- (2) Apply the magnesium chloride dust palliative in two applications of 0.25 gallon per square yard in each application.
- (3) Allow to soak for 30 minutes after each application.
- (4) Roll the surface with a pneumatic tire roller, as specified in the Contract.
- (5) Do not permit traffic on the treated surface until approved.

Other protocols for grammar, syntax, and format that have been applied in the Standard Specifications and that should be applied to special provisions appear in Table 16-1.

ITEM	IN TEXT	IN TABLES (and tabular lists)	IN LISTS (consisting of text)
Numbers	For counts from 1 to 10 use words: three hours, four posts; Counts over 10 use digits: 24 hours, 14 posts; where one of each is related, use digits for both: 6 to 12 hours. For dimensions & measurements use digits: 6 inches, 7 cubic yards.	Use digits	For counts from 1 to 10 use words: three hours, four posts; Counts over 10 use digits: 24 hours, 14 posts; where one of each is related, use digits for both: 6 to 12 hours. For dimensions & measurements use digits: 6 inches, 7 cubic yards.
Ordinal Numbers	Use words: first, fifth, twentieth	Use symbols: 1 st , 5 th , 20 th	Use words: first, fifth, twentieth
Large numbers & money	Do not reiterate in Parentheses: \$80,000 – not \$80,000 (eighty thousand dollars)	Do not reiterate in Parentheses: \$80,000 – not \$80,000 (eighty thousand dollars)	Do not reiterate in Parentheses: \$80,000 – not \$80,000 (eighty thousand dollars)
Dimensions	Use words: foot, yard, inches	May use abbreviation (ft., yd.) or symbol (' , ")	Use words
Areas	Use words: square foot, square yard	May use abbreviation: sq. ft., sq. yd.	Use words
Volumes	Use words: cubic yard, cubic feet, gallons	May use abbreviation: cu. yds. cu. ft., gal.	Use words
Densities/ rates	Use words: pounds per cubic yard, gallons per square yard	May use abbreviations: lbs./cu. yd., gal./sq. yd.	Use words
Temperature	Use symbol: °F	Use symbol: °F	Use symbol: °F
Ranges	Use "to" not "-": 180 to 190 °F, 6 to 12 inches	Use "to" or "-": 180 - 190 °F, 6 to 12"	Use "to" not "-": 180 to 190 °F, 6 to 12 inches
SI sieve sizes	Use symbols: 19.0 mm, 300 μm	Use symbols: 19.0 mm, 300 μm	Use symbols: 19.0 mm, 300 μm
SAE sieve sizes	Use words: 2 inch, ½ inch, No. 30, No. 100	Use symbols: 2", ½", #30, #100	Use symbols: 2", ½", #30, #100
Right of Way	Use words or abbreviation: Right of Way, ROW	Use abbreviation: ROW	Use abbreviation: ROW
Dual Units, e.g. sieve sizes	SI first with SAE in parentheses: 25.0 mm (1 inch)	SI first with SAE in parentheses: 25.0 mm (1 inch)	SI first with SAE in parentheses: 25.0 mm (1 inch)
CDOT Forms	Use just the form No.: Form 463	Use just the form No.: Form 463	Use just the form No.: Form 463
Other Forms	Identify the originating organization: FHWA Form 1273	Identify the originating organization: FHWA Form 1273	Identify the originating organization: FHWA Form 1273
Percentages	Use word: 12 percent, 25 percent	Use symbol: 12 %, 25%	Use word: 12 percent, 25 percent
Ratios	Use colon: 1:1, 1½:1	Use colon: 1:1, 1½:1	Use colon: 1:1, 1½:1

Table 16-1 Spec Book Grammar, Syntax, and Format Protocol

ITEM	IN TEXT	IN TABLES (and tabular lists)	IN LISTS (consisting of text)
Use of "and/or"	Do not use "and/or": alternatives are: "a, b, or both" and "a, b, c, or a combination thereof". Sometimes "a, b, or c" works just as well.	Does not usually appear in tables.	Do not use "and/or": alternatives are: "a, b, or both" and "a, b, c, or a combination thereof". Sometimes "a, b, or c" works just as well.
Use of "noun(s)"	Avoid use of "noun(s)". Can often use just the singular or plural; or rewrite the sentence: workers [however many], each worker.	Does not usually appear in tables.	Avoid use of "noun(s)". Can often use just the singular or plural; or rewrite the sentence: workers [however many], each worker.
Use of "under Item XXX"	Avoid use of this construction. Instead of "will be paid for under Item 613" use "will be paid for in accordance with Section 613."	Does not usually appear in tables.	Avoid use of this construction. Instead of "will be paid for under Item 613" use "will be paid for in accordance with Section 613."
Use of the word "any".	Avoid using the word "any", especially where it can be inferred that the Contractor chooses an alternative. Any is a vague word that can mean: all, a selected alternative, every, a specific one, etc. Examples: "The Contractor shall remove any laitance" reads better as "The Contractor shall remove all laitance"; "Any source of borrow other than an available source will be known as a contractor source" reads better as "Sources of borrow other than an available source will be known as Contractor sources."	Does not usually appear in tables.	Avoid using the word "any", especially where it can be inferred that the Contractor chooses an alternative. Any is a vague word that can mean: all, a selected alternative, every, a specific one, etc. Examples: "The Contractor shall remove any laitance" reads better as "The Contractor shall remove all laitance"; "Any source of borrow other than an available source will be known as a contractor source" reads better as "Sources of borrow other than an available source will be known as Contractor sources."
Use of shall & will	When the helping verb "shall" is used in a sentence, it normally indicates that the Contractor is required to perform the stated action in the manner prescribed. When the helping verb "will" is used in a sentence, it normally indicates an action that is intended to be performed by the Engineer or his representative as appropriate.	Does not usually appear in tables.	When the helping verb "shall" is used in a sentence, it normally indicates that the Contractor is required to perform the stated action in the manner prescribed. When the helping verb "will" is used in a sentence, it normally indicates an action that is intended to be performed by the Engineer or his representative as appropriate.
Referring to plans and specifications	In most cases, refer to "in the Contract". When it is necessary to refer specifically to plans or specifications use: "in the specifications" or "on the plans".	Does not usually appear in tables.	In most cases, refer to "in the Contract". When it is necessary to refer specifically to plans or specifications use: "in the specifications" or "on the plans".

Table 16-1 Spec Book Grammar, Syntax, and Format Protocol (Continued)

REFERENCES

1. CDOT. *Standard Specifications for Road and Bridge Construction*, Colorado State Department of Transportation.
2. CDOT. Procedural Directive 513.1, *Construction Project Specifications*, Colorado State Department of Transportation, 2016. [<https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs/specs-changes-under-consideration/pd-513-1-review/view>]
3. FHWA. *Code of Federal Regulations*, Title 23, Part 635, 2018. [<https://www.fhwa.dot.gov/legregs/directives/cfr23toc.htm>]
4. CDOT. *Project Development Manual*. [https://www.codot.gov/business/designsupport/bulletins_manuals/project-development-manual/revs-to-project-manual]
5. USC. *United States Code*, Title 23, Chapter 1, Section 112. [<https://www.gpo.gov/fdsys/browse/collectionUScode.action?collectionCode=USCODE>]
6. CDOT. *Innovative Contracting (Design-Build and CM/GC)*, Colorado State Department of Transportation. [<https://www.codot.gov/business/designsupport/innovative-contracting-and-design-build>]
7. CDOT. *Innovative Contract Provisions*, Colorado State Department of Transportation. [<https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs/innovative-specs>]
8. CDOT. Form 1215 - *Submittal of New Specification or Specification Change*. [<https://www.codot.gov/library/forms/cdot1215.pdf>]