



**MONTEZUMA COUNTY
COLORADO**

**ROAD AND BRIDGE
STANDARD SPECIFICATIONS**

The following Standard Specifications for Road and Bridge Construction in Montezuma County, Colorado have been amended this 22nd, day of September, 2014 by the Board of County Commissioners, Montezuma County, Colorado.

CONTROL OF WORK

As used in these specifications, the term "county representative" refers to an individual designated by the Board of Commissioners to perform these and similar duties, either in general or for specific projects and periods whether by appointment or contract.

The county representative will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed, and all questions which may arise as to the interpretations of plans and specifications and all questions as to the acceptability of any phase of the work on those projects for roads and bridges in Montezuma County. The county representative has the authority from the Board of County Commissioners to stop all work which is creating unsafe conditions or which is not in accordance with these Standards and/or the approved plans.

Upon written request of the county representative , the person or firm constructing the project shall furnish a certificate of compliance to specifications in the following areas of work:

| | | | |
|--------------------------------|--------------|---|----------------------------|
| Earthwork Compaction | Sec. IV (H) | 1 | test each 2000 Cubic Yards |
| Subbase Screen Anal. | Sec. V (A) | 1 | test each Source |
| Base Course Screen Anal. | Sec. VI(B) | 1 | test each Source |
| Base Course Plasticity | Sec. VI(B) | 1 | test each Source |
| Portland Cement | Sec. III (A) | 1 | test each 500 Bbls. |
| Aggregate | Sec. III (B) | 1 | test each 100 Cubic Yards |
| Consistency | Sec. III (C) | 1 | test each 50 Cubic Yards |
| Concrete Strength | Sec. III (F) | 1 | test each 50 Cubic Yards |
| Earthwork Compaction | Sec. III (B) | 1 | test each 2000 Cubic Yards |
| Surface Course Screen Analysis | Sec. VI(B) | 1 | test each 500 tons |
| Bridge, Concrete | Sec. X (B) | 1 | test each 10 Cubic Yards |

I. ROAD, BRIDGE OR STREET ACCEPTANCE

- A.** This specification applies to all new construction in Montezuma County.
- B.** The Board of County Commissioners reserves the right to modify specific requirements of these specifications for a specific road or project, based on application by the person or entity constructing the project, with sufficient justification acceptable to the Board of County Commissioners.

II. RIGHT-OF-WAY

- A.** The right-of-way for the construction of a road, bridge or street must be a minimum of sixty (60) feet in width unless otherwise varied by the Board of County Commissioners in writing. No right-of-way shall be reduced without a formal vacation action by the Board of County Commissioners.
- B.** Fencing of portions of the right-of-way by the adjacent landowner may be approved on a case-by-case basis by the County Road Supervisor, provided that the safety and integrity of the roadway and related features are maintained, that the landowner assumes all responsibility for maintenance of, and replacement, if necessary, of fencing, ditching, etc, and that the landowner removes fencing if additional portions of the right-of-way are needed for roadway or utilities improvements by written agreement.
- C.** All trees and brush shall be removed when these items will hamper visibility of users of the road at intersection, or as determined by the County Road Supervisor.

III. PLANNING AND DESIGN

A. Planning

The planning or layout of a new road shall be in accordance with these Standards and Specifications. If a road is created through the subdivision process, all provisions of the Montezuma County Subdivision Regulations must be met.

B. Design

The design of any new road shall be in accordance with these Standards and Specifications. Road plans and specifications shall be prepared by a registered professional engineer in accordance with these Standards and Specifications and shall be attached to the permit application submitted to the County. Approved plans expire after one year and must be resubmitted with any revisions in the Standards and Specifications, where applicable.

IV. ROADBED CONSTRUCTION

- A.** The county representative shall require the following, before approval to proceed with construction:
- 1.** Plans, profiles, and cross sections, shall be prepared by a licensed Professional Engineer in accordance with County Planning requirements.
 - 2.** Plans showing all drainage and irrigation structures reflecting the flow line elevation at center of road, the capacity in cubic feet per second (cfs), the direction of flow and the size of the area being drained by drainage structures. Drainage studies shall be prepared by a licensed Professional Engineer in accordance with County Planning requirements.
 - 3.** The location and easements for existing and proposed aboveground and underground utilities shall be shown on the plans. When submitted, plans shall include evidence of review by the appropriate utilities providers with their comments and changes made in response to their comments.
- B.** Alignment shall consist of a minimum horizontal curve radius of seventy-five (75) feet, and a vertical curve allowing three hundred (300) feet of stopping sight distance using 3.5 feet to reference eye level in a passenger car. New construction will intersect existing county roads at a 90° angle.
- C.** The maximum sustained grade shall be seven (7) percent, however, ten (10) per cent for less than 250 feet will be permitted upon approved application with adequate justification. At the point of intersection with any community road the intersecting road shall not be more than +3% or not less than -3% grade for a distance of 15 feet. All surfaces shall have a 0.02 ft/ft crown except where curves require super elevation.
- D.** Intersections will be described as any access to a community road serving more than 2 residential structures, or community roads to other community roads. Intersections and driveways shall provide visibility in each direction of intersected roadbed of three hundred (300) feet or more, using 3.5 feet to reference eye level in a passenger car. Intersections shall have minimum radii as shown in Plate 2, 18-foot for driveways and intersections of community roads with other community roads. If in the judgment of the county representative, truck traffic justifying a larger turn radius, the county representative shall recommend such to the Board of County Commissioners, which shall require an appropriate radius. Intersections shall have paved or unpaved of two or four feet width as determined by the county representative upon review of plans.

- E. Driveways will be described as any access onto a county road serving two or less residential structures.

- F. All cul-de-sacs shall require a 118' minimum right-of-way "bulb" as shown in Plate 3, except that temporary cul-de-sacs where there are future extensions of roads (for which right-of-way is dedicated) may have designated "cul-de-sac" easements on lots, subject to review and approval of the county representative.

- G. Culverts shall be placed at all natural and manmade drainage's and with a maximum ditch carrying distance of eight hundred (800) feet. Minimum culvert size shall be eighteen (18) inches diameter. Culverts shall extend beyond the roadway and shoulder sufficiently to allow 3:1 slope unless terrain justifies a waiver by the county representative Drainage culverts shall be provided at all access and driveways where required (see Montezuma County driveway permit regulations). Culvert installation shall consist of a minimum trench width of the diameter of the culvert plus 24 inches. The trench shall be bedded with 6 inches of fine bedding material. Back fill material shall be a 2 inch minus structural fill material placed in not more than 6 inch lifts compacted to 95% of the maximum density. The top of the culvert shall be a minimum of one (1) foot below the finished base course grade. Culverts shall be of the following minimum gauge material:

| | |
|---------|----------|
| 18" | 16 gauge |
| 24" | 16 gauge |
| 30"-48" | 12 gauge |

- H. Roadbed fills shall be compacted so as to meet 95% density of AASHTO T 99 and 90% density of AASHTO T 180. All topsoil shall be removed prior to compaction of the subgrade and subgrade compacted prior to placement of subbase material. Drainage ditches and sideslopes shall have topsoil replaced and shall be reseeded after cutting and shaping.

- I. Road construction plans shall be reviewed and approved by the county representative before staking of right-of-way and construction. Roadbed construction shall be inspected and approved by the owners P.E. before proceeding with the subbase course.

V. SUBBASE COURSE

The subbase course shall consist of machine crushed aggregate particles conforming to the following graduation and depth requirements.

A. Machine crushed aggregate:

Compacted depth shall be a minimum of eight (8) inches of two-inch-minus material. Material shall be within the following limits when processed through AASHTO sieves: Reference: CDOT Standard Specification 2011: Class 4, Table 703-3.

| <u>Sieve Size</u> | <u>% Passing</u> |
|-------------------|------------------|
| 2" | 100 |
| 3/4" | 50-90 |
| #4 | 30-50 |
| #200 | 3-12 |

All material shall be of sound aggregate particles and shall be free of organic matter. 90% of the 2" aggregate shall have at least two mechanically induced fractures.

- B. Compaction of subbase shall be verified by AASHTO T 191 or T 205 or T 238 and T 239. The compacted density of the subbase course shall be 95% of maximum density, using AASHTO T99.
- C. The subbase course shall be inspected and approved by the owners P.E. before proceeding with the Base Course application.

VI. BASE COURSE

- A. A crushed aggregate base course shall be placed to a compacted minimum depth of four (4) inches on the subbase course, using three-quarter-inch-minus material. Where no paved surface course is required, the base course shall be construed to be surface course. In such cases, additional conditions may be required, based on recommendations by the county representative based on location grade, and other conditions. All materials will be approved by the owners P.E. prior to placement.
- B. The size characteristics of the aggregate for the base course shall be as follows when tested according to AASHTO T 11 and AASHTO T 27:
Reference: CDOT Standard Specification 2011: Class 6, Table 703-3.

| <u>Sieve Size</u> | <u>& Passing</u> |
|-------------------|----------------------|
| 3/4" | 100 |
| #4 | 30-65 |
| #8 | 25-55 |
| #200 | 3-12 |

All material shall be of sound particles and shall be free of organic matter. The plasticity index shall not exceed six (6) and the liquid limit of that portion passing a #40 sieve shall not exceed thirty five (35). The compacted density of the base course shall be 95% of maximum density, using AASHTO T 99.

- C. When bituminous paving is to be constructed, the Base Course shall be inspected and approved by the owners P.E. before proceeding with the paving. Otherwise the Base Course inspection shall serve as a final inspection of the road construction.

VII. SURFACE COURSE

A. Crushed aggregate surface course (see Section VI - B & C)

B. Bituminous Paving

1. Multiple Surface Treatment (chip-seal).

A minimum of 3 surface treatments, resulting in a bituminous paving thickness of a minimum of 1-5/8 inches is required for surface treatment paving (chip-seal). The top of the Base Course will be coated with 2/10 gallon/SY of Asphalt Emulsion Prime (AEP). The first, or lowest, course shall consist of 3/4"-minus clean aggregate and the appropriate asphalt oil. The second, or middle, course shall consist of 3/4"-minus clean aggregate and the appropriate asphalt oil. The third, or surface, course shall consist of 1/2"-minus clean aggregate and the same appropriate asphalt oil used in the second course.

Appropriate asphalt oil ("chip oil") must be of a type listed as HFMS2P (High Float Medium Set 2% Polymerized) water-based emulsion oil. The specific asphalt oil to be used for each treatment must be specified and approved in advance by the County Road Department.

The distributor must apply each application at uniform pressure and temperature and at the specified application rate. The aggregate and asphalt rate range is:

| <u>Course</u> | <u>Size of Aggregate</u> | <u>Aggregate 1b/SY</u> | <u>Asphalt oil gal/SY</u> |
|---------------|--------------------------|------------------------|---------------------------|
| 1 | <3/4" | 40-50 | .40-.50 |
| 2 | <3/4" | 25-30 | .25-.40 |
| 3 (Top) | <1/2" | 15-20 | .20-.35 |

Each course shall be rolled a minimum of 3 passes with an approved rubber tired roller. A minimum of 7 days between each course is required, and the entire surfaced area shall be swept before applying the second and third courses.

3/4"-minus material must be a hard rock crushed aggregate with 100% passing the 3/4" sieve, 0-15% passing the #4 sieve, and 0-4% passing the #200 sieve. 1/2"-minus material must be a hard rock crushed aggregate with 100% passing the 1/2" sieve, 0-15% passing the #4 sieve, and 0-4% passing the #200 sieve.

It is recommended that no surface treatment (chip-seal) be applied unless the air temperature is at least 70 degrees F^o and rising.

2. Plant Mixed Asphalt Pavement:

When plant mix (hot mix) material is to be used for paving, specifications and application processes shall be submitted to the county representative for approval prior to application. These shall include, but not be limited to, the specifications for the aggregate, bituminous materials, add-mixes, application temperatures and quality-control procedures, and the approved source of the material.

VIII. CONCRETE

A. Portland Cement:

1. Portland cement shall conform to the requirements of the following cited specifications for the type specified or permitted:

| <u>Type</u> | <u>Specifications</u> |
|-----------------|-----------------------|
| Portland Cement | AASHTO M 85 |
| Masonry Cement | AASHTO M 150 |

B. Aggregate:

1. Coarse aggregate for concrete shall conform to the requirements of AASHTO M 80 and shall conform to the coarse aggregate tables from AASHTO M 43, No. 3, No. 4, No. 57, No. 67, No. 357, and No. 467, where specified.
2. Fine aggregate for concrete shall conform to AASHTO M 6 standard test.

C. Consistency:

Consistency shall be measured in accordance with AASHTO T 119.

D. Placement:

The placement of concrete shall conform to the dimensions displayed in the standard typical sections of those dimensions shown on plans.

E. Testing:

The concrete mixture shall produce a minimum 28 day compressive strength of 3000 psi, unless otherwise specified.

IX. UTILITIES

When utility devices are to be installed within the County Road right-of-way, the County policy on Utility Use of County Rights-of-way shall apply.

X. TRAFFIC CONTROL

- A. Approved barricades, warning signs, and flagmen shall be used in connection with all road work, in accordance with CDOT specifications.
- B. Road designation and traffic control signs as required by Montezuma County shall be installed in an approved manner prior to acceptance of the road. These shall include, at a minimum, the appropriate colored street signs, stop or yield signs for all intersections with existing county roads, and warning signs on existing county roads, including temporary "new intersection ahead" and similar signs, in accordance with Manual on Uniform Traffic Control Devices (MUTCD).

XI. BRIDGES AND MULTIPLATE STRUCTURES

When bridges or multiplate structures are to be installed, complete plans and specifications for purchase and installation shall be submitted to the county representative for approval before beginning construction.

XII. GUARANTEES

After construction is complete the owners licensed Professional Engineer shall present to Montezuma County in writing, verification that all phases of construction has been completed in compliance of the Montezuma County Road and Bridge Standards for acceptance.

XII. AMENDMENTS

The Board of County Commissioners may from time to time amend these regulations by resolution. Record of Amendments:

Originally Adopted 13 JAN 1981

First amendment, 10 MAR 1986 (new publication)

Second amendment, 09 SEP 1996 (road surface and hammerhead cul-de-sac)

Third amendment, 15 SEP 1997 (road surface)

Fourth amendment, 18 SEP 2006(new publication)

Fifth amendment, 18 DEC 2008 (new publication)

Sixth amendment, 22 SEP 2014 (section V, (A), machine crushed aggregate, section VI (B), base course, page 10 typical road section)

XIII. REFERENCES

The following references are used in these Specifications. Failure to list a reference or a standard does not constitute any statement or claim that a reference or standard does not apply. Additional standards based on state or federal law may also apply. Unless otherwise stated, the most current version of the reference shall be used.

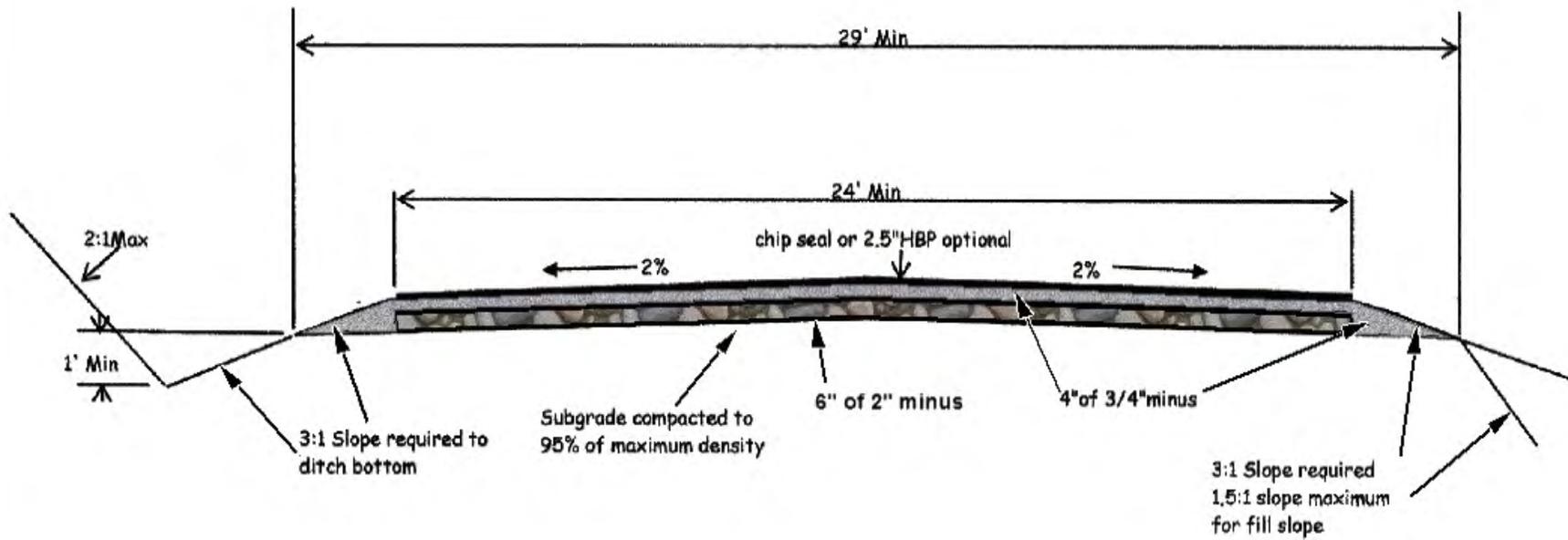
- A. County Utility Use of County Right-of-Way
- B. Colorado Department of Transportation Traffic Safety Standard Plans and Specifications, and Manual on Uniform Traffic Control Devices (MUTCD).
- C. American Association of State Highway and Transportation Officials (AASHTO) Standards and Methods, including T-11, T-27, T-99, T-108, T-191, T-205, T-238, and T-239; M-6, M-43, M-80, M-83, M-85, M-119, and M-150.

XII. LIST OF PLATES

- 1. Typical Road Section – Community Road
- 2. Typical Road Intersections
- 3. Typical Cul-de-sacs

Montezuma County Road Standards Typical Road Section - Community Road

Minimum Right-of-Way = 60'

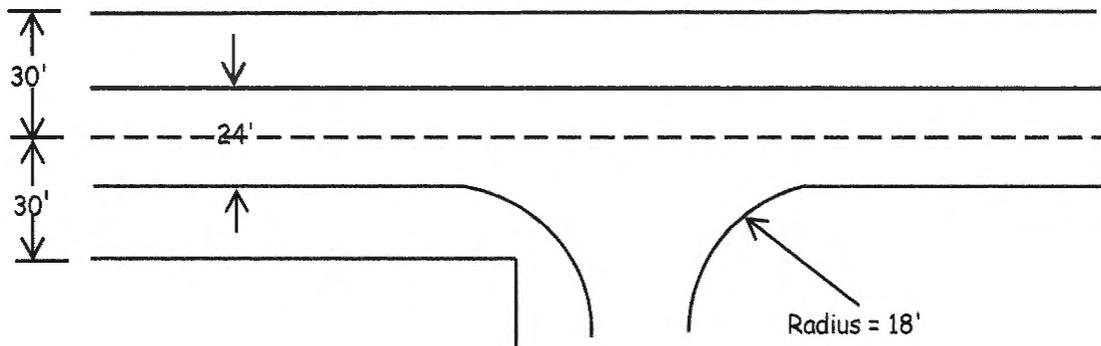


not to scale

Plate 1

Montezuma County Road Standards
Typical Road Intersection

ROW = 30' from centerline



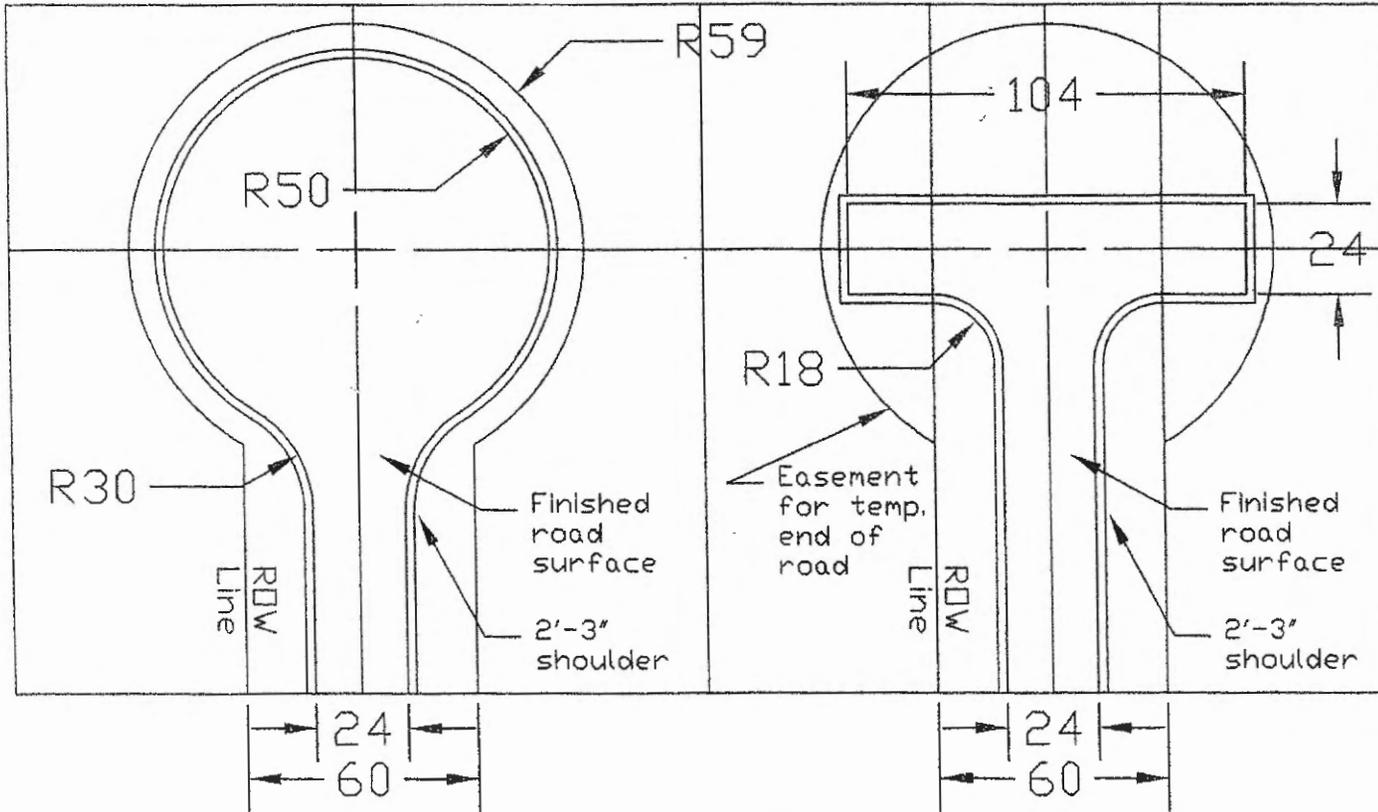
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Plate 2

MONTEZUMA COUNTY ROAD STANDARDS Typical Cul-de-sac

Permanent

Temporary/Hammerhead



Revised JUL 2006 (NAB)

Scale:
Ref:
Drawn by: NAB

Plate 3