

Rural Engineering Standards



ARAPAHOE COUNTY
PROTEC

Adopted August 31, 2012

Acknowledgements

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Executive Summary

At the present time, the design and construction standards in Unincorporated Arapahoe County for engineering items such as roadways, drainage, grading, erosion and sediment control are the same for rural and urban developments. The current standards were primarily written for developments in the urban area, but the County recognizes that the standards need to be modified for rural developments.

Since the adoption of the Arapahoe County Subdivision Design Principles and Standards within the Land Development Code (LDC) in 2003, the Arapahoe County Infrastructure Design and Construction Standards and Arapahoe County Grading, Erosion, and Sediment Control (GESD) criteria in 2005, and the adoption of the Arapahoe County Stormwater Management Manual in 2007, Engineering Services Division Staff has increasingly recognized the need for distinct engineering requirements between the rural and urban areas of the County. In addition, as articulated in the 2001 Comprehensive Plan, the Board of County Commissioners (BOCC) has limited fiscal resources with which to meet the infrastructure needs of the County. Accordingly, the Comprehensive Plan recognizes that rural areas of the County do not warrant the same level of road infrastructure that more urbanized areas require. Therefore, it is the County's intent to establish a modified engineering standard that is suitable for the design and construction of proposed residential developments within the rural area of unincorporated Arapahoe County in order to maintain the rural ambiance, viable agricultural operations, and natural areas of this portion of the County.

To accomplish this, the Engineering Services Division fully assessed the differences between the design and construction standards required for both urban and rural developments. Five main issues were identified through this process. These included 1) how to provide providers of emergency services including but not limited to fire fighting, law enforcement, ambulance, emergency medical, or other emergency services an adequate means of access in order to protect the health, safety, and welfare of residents of unincorporated Arapahoe County from damage, injury, and loss of life and property resulting from natural catastrophes, catastrophes of human origin, civil disturbance, or other dangers; 2) how to address construction of public roadway infrastructure within developments in the rural area; 3) how to address right-of-way obstructions (mailboxes); 4) how to address stormwater management for rural residential developments; and 5) how to address erosion/sediment control for rural residential developments.

These Rural Engineering Standards coordinate and work in conjunction with the current Arapahoe County 2035 Transportation Plan and build on the current Rural Cluster Option regulations. The Engineering Services Division has developed these new engineering standards that establish specific minimums as well as desirable standards for the design and construction of proposed residential developments within the rural areas of Arapahoe County.

These Standards are established to reflect the best judgment as to design criteria for particular rural conditions. In addition to safety considerations, particular emphasis is given to incorporate design elements that address the rural character of eastern Arapahoe County. These Standards apply to new residential buildings, new portions of building used

or intended to be used for human habitation, and/or new residential developments. It is not the intent for these Standards to be retroactive.

Design features that fall outside normal design criteria and accepted practice are to be determined using sound engineering judgment and should be thoroughly documented. The final design must meet the needs and expectations of the County and the community, as well as providing for the users' safety.

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Acknowledgements	i
Executive Summary	ii
Table of Contents	iv
Chapter 1. Legal & Jurisdictional (General Information)	1
Section 1.01 - Short Title	1
Section 1.02 - Scope.....	1
Section 1.03 - Purpose	1
Section 1.04 - Authority.....	1
Section 1.05 - Amendments and Revisions.....	2
Section 1.06 - Enforcement Responsibility	2
Section 1.07 - Review and Approval	2
Section 1.08 - Relationships to Other Standards.....	2
Chapter 2. Roadway Design for Residential Development in Rural Areas	3
Section 2.01 - Appendix R – Regulations Governing Access and Driveways	3
Section 2.02 - Number of Entries	3
Section 2.03 - Intersections	3
(a) Sight Distance.....	3
Section 2.04 - Rural Cluster Option overview	4
(a) Figure 1: Applicability of Rural Cluster Option	4
(b) Rural Cluster limitations	4
Section 2.05 - Arapahoe County 2035 Transportation Plan	5
Section 2.06 - Obstructions and Breakaway Structure Requirements	5
(a) Obstructions	6
(b) Breakaway Structure Requirements	6
Section 2.07 - Signage	7
Section 2.08 - Equestrian Trails	8
(a) Permission to Use Land.....	8
(b) Equestrian Trails.....	8
(c) Signing for Equestrian Access.....	8
(d) Suggested Equestrian Trail Cross-Sections.....	9
Rural Roadway Cross-Sections	14
Chapter 3. Drainage (Stormwater Management and Water Quality Requirements)	15
Section 3.01 - Existing Exemptions within the County’s Stormwater Management Manual	15
Section 3.02 - Rural Residential Detention Requirement.....	15
Section 3.03 - Drainage Crossings	16
Section 3.04 - Elevation Certificates and/or Floodplain Analysis	16
Chapter 4. Grading, Erosion, and Sediment Control	18
Section 4.01 - Regulation History	18
Section 4.02 - Residential development outside the County’s MS4 Permit Area.....	19
Section 4.03 - Method of Compliance	19
Section 4.04 - Residential areas that create less than one acre of disturbance.....	21
Section 4.05 - Performance Objectives	21
Section 4.06 - Other Items.....	21
Appendix R – Regulations Governing Access and Driveways	
References	
Glossary	

Chapter 1. Legal & Jurisdictional (General Information)

Section 1.01 - Short Title

These Standards, together with all future amendments, shall be known as the “Arapahoe County Rural Engineering Standards” (hereinafter referred to as ‘Standards’) and are adopted by resolution and incorporated by reference as part of the Arapahoe County Subdivision Regulations (hereinafter referred to as ‘Regulations’).

Section 1.02 - Scope

The requirements contained in these Standards apply to all new residential construction or other work done on, over, or under parcels within unincorporated Arapahoe County in zoning districts A-E or A-1.

These Standards shall apply to parcels in the A-1 and A-E zoning districts within the unincorporated areas of Arapahoe County east of Watkins Road (CR-97), except where the County’s jurisdiction is superseded by the State or by another jurisdiction. More specifically, any A-1 and A-E zoning districts within the areas east of the Watkins Road alignment extended south to the Arapahoe County and Elbert County border. The area would include the extent east to the Arapahoe County and Washington County border.

ADD GRAPHIC

These Standards do not apply to State Highways. Any access onto State Highways is controlled by the State of Colorado. Arapahoe County takes no jurisdictional authority over access onto a State Highway. The State Highway Access Code, as amended, governs access onto State Highways.

Section 1.03 - Purpose

These Standards present the minimum design and technical criteria for analysis and design of residential construction. Options to comply with the provisions of these Standards may be provided by the applicant. However, it shall be the responsibility of the applicant to demonstrate that an option meets or exceeds the minimum criteria contained herein. Policies and technical criteria not specifically addressed in this document shall follow the Arapahoe County Infrastructure Design and Construction Standards.

Section 1.04 - Authority

The Regulations are adopted pursuant to the authority conferred within: Article 28 of Title 30 (County Planning); Article 2 of Title 43 (State, County and City Highway Systems); Article 67 of Title 24 (Planned Unit Development Act); Article 20 of Title 29 (Land Use Control and Conservation); and other applicable sections of Colorado Revised Statutes, as amended. Pursuant to the above statutory authority, these Standards are adopted by resolution and are incorporated by reference as a part of the Regulations.

Section 1.05 - Amendments and Revisions

These Standards may be amended from time to time as new technology is developed and/or the experience gained in the use of these Standards indicates a need for revision. Technical Modifications to these Standards shall be approved by the Director of the Department of Public Works and Development. Policy changes within these Standards shall be approved by the BOCC following the recommendations of the Director of the Department of Public Works and Development (or the Director's named representative). Minor revisions that provide additional clarity and/or reflect reformatting and do not affect technical or policy modifications may be made without the action of the Director or the BOCC. The Director of the Department of Public Works and Development shall monitor the performance and effectiveness of these Standards and will recommend changes, amendments or revisions, as needed.

Section 1.06 - Enforcement Responsibility

It shall be the duty of the Director of the Department Public Works and Development (PWD), acting on behalf of the BOCC to enforce the provisions of these Standards.

Section 1.07 - Review and Approval

The County shall review all submittals for general compliance to these Standards. Approval by the County does not relieve the owner, engineer or designer from responsibility of insuring that the calculations, plans, specifications, construction, and record drawings are in compliance with the Standards as stated in the owner's and engineer's certifications.

Section 1.08 - Relationships to Other Standards

Since the County is the approval authority for land development, these Standards, which stipulate certain minimum conditions for land development changes, shall apply for the Rural Area as defined in Section 1.02 - above. The criteria presented in these Standards represent required values. These values imply the lowest acceptable limit in design. However, if the State or Federal Government imposes more stringent standards, criteria, or requirements, these shall be incorporated into this document after proper notice and public hearing(s) required for modifying County Regulations and Standards.

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Chapter 2. Roadway Design for Residential Development in Rural Areas

The purpose of these design standards is to protect the public welfare by regulating construction of private accesses serving multiple residences and those private driveways accessing single residences. These standards are not intended to inhibit creative design, provided that safety is maintained and site disturbance is minimized, nor are they intended to prevent development of private property in unincorporated Arapahoe County.

Design and construction standards can vary, especially as traffic volumes increase, but the overall goal should be to provide a safe, economical, and low-maintenance road system that is designed and constructed to meet the needs of the users. The Engineering Services Division utilized different guidelines, thresholds, the County's maintenance history, the County's current Rural Cluster regulations, the Rural Focus Group, as well as the 2035 Arapahoe County Transportation Plan to establish design and construction minimums for roadway design in the areas of unincorporated Arapahoe County as defined in Section 1.02 - above.

Section 2.01 - Appendix R – Regulations Governing Access and Driveways

Appendix R, which stipulates certain minimum conditions for access and driveways, shall apply for all parcels proposed for residential uses within unincorporated Arapahoe County in zoning districts A-E or A-1 as defined in Section 1.02 - above. Appendix R is adopted by separate resolution, incorporated by this reference, and made a part of these Standards.

Section 2.02 - Number of Entries

No more than one access shall be provided to an individual parcel or to contiguous parcels under the same ownership if the parcel proposes access to a County maintained public roadway. Refer to Appendix R, Section AR103.3 for more information.

Section 2.03 - Intersections

Private intersections with other private roads may require an increase in the roadway width at the approach to accommodate storage, additional laneage and provide for proper roadway alignment.

Private intersections with public roads shall meet all public roadway standards at the intersection. Transitions of pavement width and transition distance will be reviewed on a case-by-case basis.

(a) Sight Distance

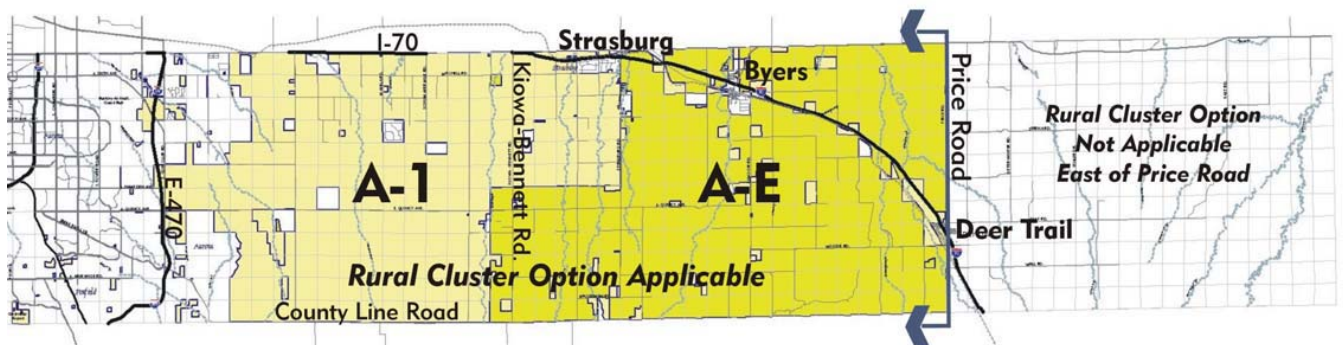
Sight distance is the length of the roadway ahead that is visible to the driver. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path, or overtaking a moving object in its path.

Both the horizontal and vertical sight distance shall be checked to ensure that the sight distance along the crossing roadway is sufficient to allow a vehicle to turn right, cross, or turn left, whichever is required.

Section 2.04 - Rural Cluster Option overview

Per the Land Development Code, there are two areas where properties are eligible for the rural cluster option. 1) property zoned “A-E”, provided the property is located west of the Town of Deer Trail and west of Price Road; and 2) property zoned “A-1”, as shown in Figure 1 below. The areas encompassing the Rural Cluster Option are not the same as those that encompass the Rural Engineering Standards. The Rural Engineering Standards will include A-1 and A-E zoning districts west of Price Road, but will not include A-1 parcels west of the Watkins Road alignment.

(a) *Figure 1: Applicability of Rural Cluster Option*



(b) *Rural Cluster limitations*

Rural Clusters are limited to single-family detached residences, agricultural uses and activities, passive open space or recreation, as further described in Section 13-1100, “Rural Cluster Option,” of the Land Development Code.

Rural Clusters must include a minimum land area of at least 70 acres and must have primary access from a paved County road across the full frontage of the proposed subdivision. The internal County road must be paved to the County construction standards per the Rural Cluster regulations (Section 14-1000). The current Rural Cluster Private Roadway Rural Cross Section requires 20-foot paved surface width plus two (2) six-foot (6’) gravel shoulders within a variable tract width with the approval of the applicable fire district and provided adequate roadside drainage is assured. Requirements for Drainage and Grading, Erosion and Sediment Control are the same for a Rural Cluster as for development in urban areas.

Property owners within a Rural Cluster subdivision shall own and maintain all private internal roads under common ownership. All roads necessary to provide access to the cluster subdivision from a county road, but not located within the boundaries of the subdivision, shall be constructed to the specifications of the

county's standards for either rural private roadways or rural (public) roadways described in Section 14-1004.04.

Section 2.05 - Arapahoe County 2035 Transportation Plan

The Arapahoe County 2035 Transportation Plan (AC Trans Plan) designated public roadways that are planned for paving as well as the gravel roads that are anticipated to remain gravel. Figure 24, found at the end of this Chapter, illustrates the roads that are planned up to year 2035. In conjunction with Appendix R referenced in Section 2.01 above, this Standard intends to utilize the AC Trans Plan Figure 24 to determine if an access shall be paved or graveled. However, Figure 24 may be revised as additional paving may occur for safety improvements within the eastern communities. Other roadway paving may also be necessary as development occurs in the Rural Area in order to meet ambient air quality and air pollution regulations (Colo. Rev. Stat. § 25-7-100, et seq.).

The AC Trans Plan also designates rural roadway classifications for public roads. Secondary Rural Road and Two-Lane Rural Arterial typical sections include 14-foot through travel lanes to enhance the safety of the rural corridors with higher speeds, more direct access, and the relatively frequent need to pass slow-moving farming equipment or postal vehicles. Medians were also established to provide width for a center turning lane, when appropriate, and to provide lateral clearance between opposing vehicle movements. A wider painted median is provided within the Four-Lane Rural Arterial section to provide greater inside clear zone due to the higher speeds and rolling vertical alignment typically experienced within the Rural Area. Rural roadway cross-sections may also be found at the end of this Chapter.

If direct access is proposed to a County maintained road, the roadway classification should be known in order to meet the suggested guidelines presented for lateral installation of structures as detailed in the next section.

Section 2.06 - Obstructions and Breakaway Structure Requirements

Pursuant to Colorado Revised Statutes 43-5-301, it is a misdemeanor to place or erect any fence, house or other structure, or dig pits or holes in or upon any County road, or place thereon or caused to be placed thereon any stones, timber, or trees or any obstruction whatsoever. In addition, this statute allows the Board of County Commissioners to file a civil action for the removal of any obstruction.

It is general County policy to require breakaway supports for new structures (e.g. mailboxes and/or newspaper delivery boxes) and to require these structures to be located on private property, outside any County right-of-way or County dedicated easement. Breakaway structures are to be placed in a manner that avoids sight obstruction and safety hazards for the motorist, cyclists, or pedestrian.

Any access to State Highways shall comply with the State Highway Access Code, as amended, and obtain an access permit from the Colorado Department of Transportation.

(a) *Obstructions*

Obstructions include both non-traversable terrain and fixed objects (buildings, non-breakaway mailboxes, monuments, large landscape features or materials such as boulders, trees, tall shrubs, plastic or wood decorations, etc.). Roadside obstructions within County right-of-way or County dedicated easements are not allowed. Roadside obstructions can interfere with the safety of the traveling public or the function, maintenance, or operation of the County maintained roadway.

In the event that obstructions are proposed in the clear zone but are outside of County right-of-way or County dedicated easements, roadside barrier warrants shall be checked to determine if a roadside barrier is necessary, see Arapahoe County Infrastructure Design and Construction Standards (IDCS). In the event warrants are met, the applicant shall be responsible for providing an acceptable type of roadside barrier.

On State Highways, the owner shall provide adequate clear zones per the State Highway Access Code, as amended.

The County may remove obstructions that currently exist within County right-of-way or County dedicated easements, if the obstruction interferes with the safety, maintenance, or operation of the County maintained roadway.

(b) *Breakaway Structure Requirements*

No structures shall be allowed to exist within County right-of-way or County dedicated easement, unless required by the local Postmaster in coordination with PWD Staff. A structure that is placed after the date of approval of this Standard and does not conform to these provisions is an unauthorized encroachment and may be removed by the County at the cost of the owner.

- i. Mail or delivery box placement. Lateral installation of mail or delivery boxes on roadways without curbs should be offset from the travel lane in accordance with the roadway's designated classification. The lateral installation of mail or delivery boxes should also be located on the right hand side of the roadway per a mail carrier's line of travel. Widths of offset distances in relation to existing roadways and future roadway widening as established by the AC Trans Plan are presented in Table 2.06- below. Most vehicles accessing these boxes should be clear of the traveled way when the lateral installation is outside of the radius of access, shoulder, or turnout, thus creating a safer, more convenient use and minimizing hazards to roadway traffic. PWD Staff will work with local United States Postal Service (USPS) officials to consider individual sites on a case-by-case basis. Local Post Offices shall be contacted for information regarding mail delivery and USPS mailbox regulations.
- ii. Mail or delivery box support structure. Support structure shall be of swing-away/breakaway design. Support structure design shall be followed to reduce damage from snowplows and other maintenance equipment and to minimize hazards to roadway traffic. Support structure design should be no more substantial than required to resist service loads. If the local Postmaster requires a structure within a County maintained road right-of-way or County

dedicated easement and a breakaway support is not provided, the alternate support design shall be reviewed, approved, and permitted by PWD Staff. The applicant shall obtain a Street Cut and Right-of-Way Use Permit prior to placement of non-standard structure. Local Post Offices shall be contacted for mailbox height requirements.

- iii. Multiple box. Multiple box installations are subject to the same criteria and permitting requirements as single box installations. A Neighborhood Delivery and Collection Box Units (NDCBU) is a specialized type of multiple mailbox installation. The NDCBU is a cluster of 8 to 16 locked boxes mounted on a pedestal or within a framework. Although NDCBUs are typically used in urban area, their use has been observed in the Rural Area of Arapahoe County. If this type of installation is proposed, the local Post Office shall approve its use and PWD Staff shall be contacted prior to its installation.

TABLE 2.06- Suggested Guidelines for the Lateral Placement of Obstructions

Roadway Classification*	Width from Road Travel Lane (Feet)	
	Preferred	Minimum
Two-lane Rural Arterial	> 10	8
Four-lane Rural Arterial	12	10
Six-lane Rural Arterial	12	10
Private Residential Access	10	8
Private Residential Driveway	8	6
Curbed residential street	Not Applicable	

* The Arapahoe County 2035 Transportation Plan has established widening of County maintained roadways through the year 2035. If direct access is proposed to a County maintained roadway, the ultimate roadway laneage should be used. County Roadway Laneage and Right-of-Way charts are included at the end of this Chapter.

Section 2.07 - Signage

It is recognized that urban traffic conditions differ from those in rural environments, and in many instances signs are applied and located differently. The latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) includes several new standards, guidelines, options, and support material related to rural areas. Many of these provisions target compliance dates as established by the Federal Highway Administration. It is recommended that the latest edition of the MUTCD be followed for new residential developments.

Signage can be used for many purposes in a Rural Residential Area. Signs that indicate to motorists they are in a Rural Residential Area are encouraged as well as signs that indicate a posted speed limit for the area, warning signs for children playing or crossing, equestrian crossings, and/or farm vehicles. These signs may be used at appropriate locations in a Rural Residential Area. Any signs proposed within County maintained right-of-way shall receive approval from the County.

Section 2.08 - Equestrian Trails

The County's Open Space Master Plan affords an opportunity to coordinate planning and construction of the trail system necessary to efficiently connect Open Spaces and other public destinations. Internal pedestrian/bike circulation within rural developments should be more "philosophy" and less "standards". Pedestrian/bike trail guidelines may be found within the County's Open Space Master Plan.

While use of both unimproved and improved trails and trail crossings are at the user's own risk and users assume the risk and responsibility of all year-round aspects of riding natural trails, as well as being alert to changes in headroom clearance under trees, bridges, structures or other obstacles, it is recommended that the following guidelines be utilized if equestrian trails are proposed in the Rural Area of the County.

(a) Permission to Use Land

Access to any length of trail or perceived trail corridor, on either private or public land, is by permission only. No one has the authority to assume permission or grant permission to access another's property. Parking for vehicles and trails for trail riding is also by permission. Parking within County right-of-way is prohibited.

(b) Equestrian Trails

Equestrian trails are typically bare earth treads that vary from a minimum of 2 foot to maximum of 6 foot wide. Care should be taken in tread layout to flow with the land.

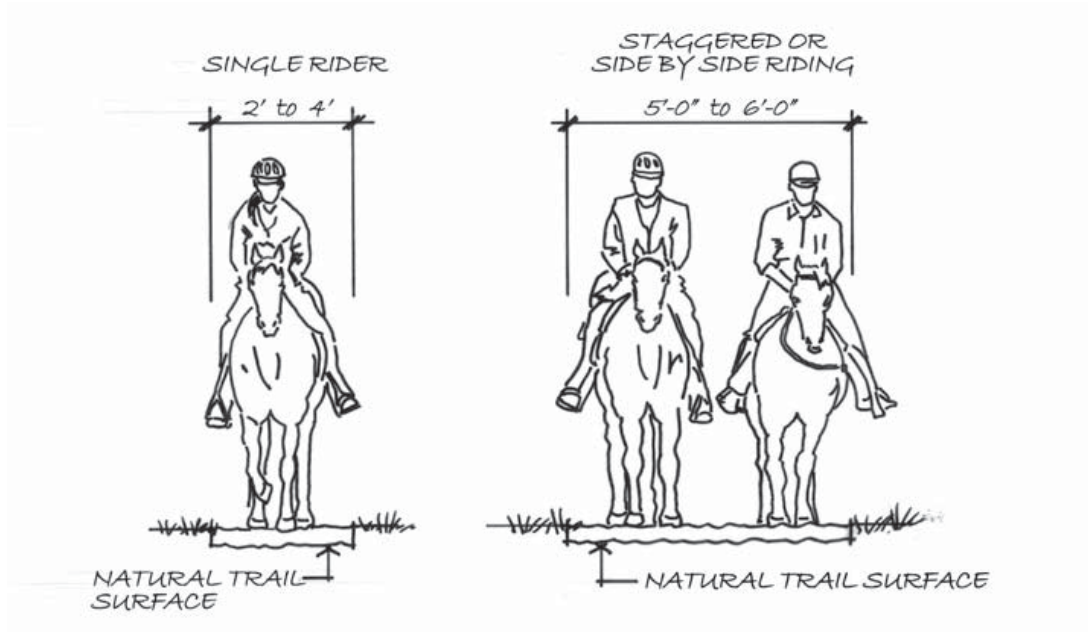
Equestrian crossings are acceptable if there is adequate approach sight distance and appropriate signing.

Equestrian access to State Highways will require an access permit from the Colorado Department of Transportation.

(c) Signing for Equestrian Access

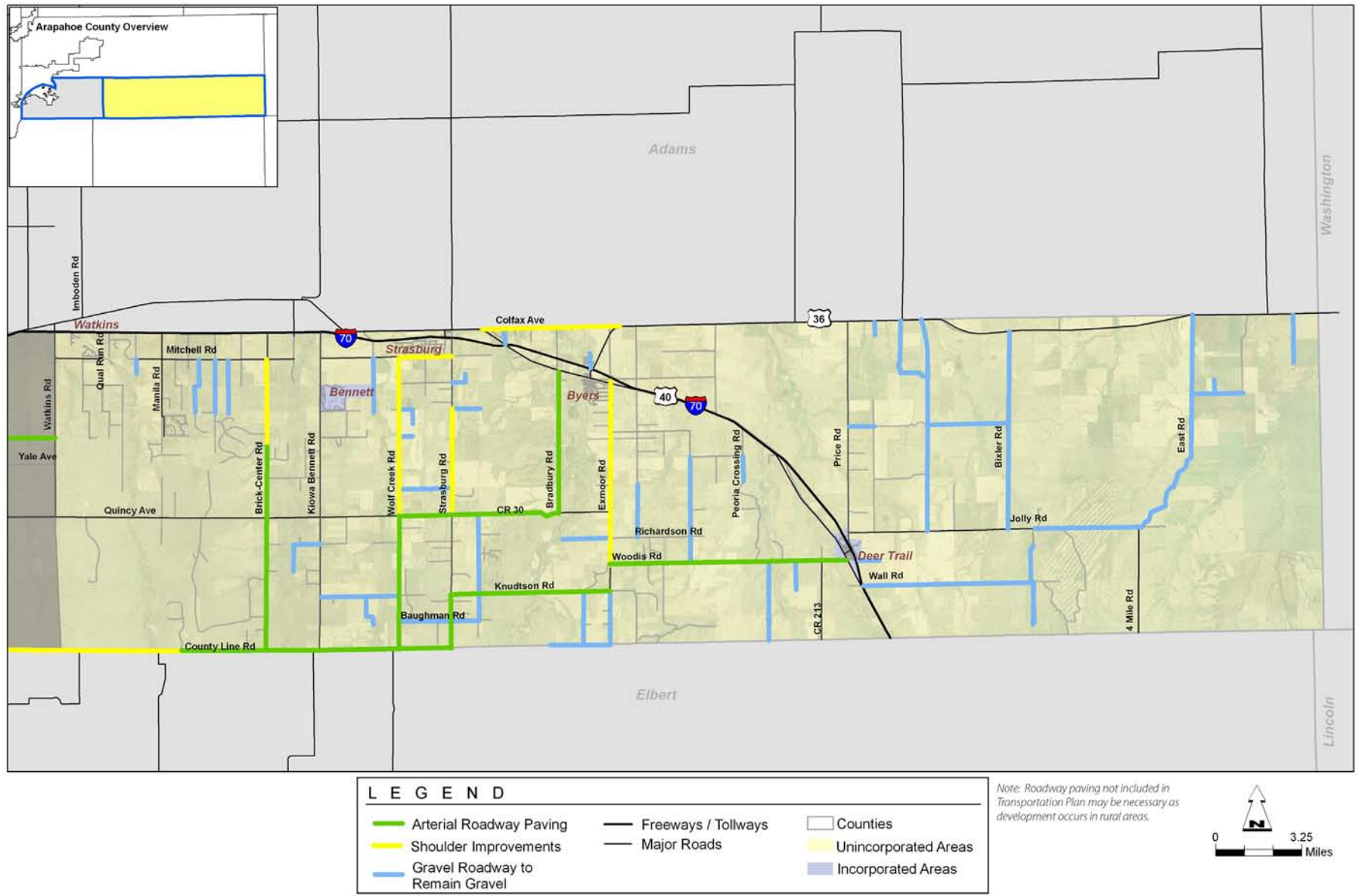
A sign reading as follows should be posted by a private or public landowner at a boundary where equine activities will take place: **WARNING: UNDER COLORADO LAW, AN EQUINE PROFESSIONAL IS NOT LIABLE FOR AN INJURY TO OR THE DEATH OF A PARTICIPANT IN EQUINE ACTIVITIES RESULTING FROM THE INHERENT RISKS OF EQUINE ACTIVITIES PURSUANT TO SECTION 13-21-119, COLORADO REVISED STATUTES.**

(d) Suggested Equestrian Trail Cross-Sections



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Figure 24. Arapahoe County 2035 Paving Plan – East End



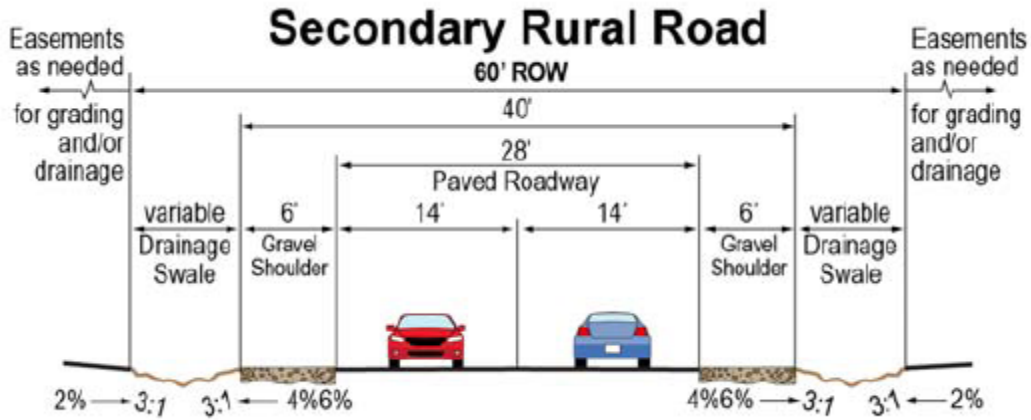
Roadway	Classification	From	To	Proposed Lanes	ROW
6th Ave.	Urban Arterial	Buckley Rd.	E-470	4	114
6th Ave.	Urban Arterial	E-470	Harvest Rd.	6	144
6th Ave.	Semi-Urban Arterial	Harvest Rd.	Powhaton Rd.	4	114
6th Ave.	Rural Arterial	Powhaton Rd.	Watkins Rd.	2	114
6th Ave.	Rural Arterial	Watkins Rd.	Kiowa-Bennett Rd.	2	114
6th Ave.	Rural Arterial	Kiowa-Bennett Rd.	Wolf Creek Rd.	2	114
6th Ave.	Semi-Urban Arterial	Wolf Creek Rd.	Strasburg Rd.	2	114
Alameda Ave.	Semi-Urban Collector	Gun Club Rd.	Harvest Mile Rd.	2	76
Arapahoe Rd.	Urban Arterial	I-25	Parker Rd.	6	144
Arapahoe Rd.	Urban Arterial	Parker Rd.	Liverpool St.	6	144
Arapahoe Rd.	Urban Arterial	Liverpool St.	Smoky Hill Rd.	6	144
Bellevue Ave.	Urban Arterial	Broadway	University	4	114
Bellevue Ave.	Urban Arterial	I-25	DTC Blvd.	6	144
Bellevue Ave.	Urban Arterial	Picadilly St.	Gun Club Rd.	4	114
Bowles Ave.	Urban Arterial	Platte Canyon Rd.	Santa Fe Dr.	4	114
Bradbury Rd.	Rural Arterial	US 36	Quincy Ave.	2	114
Brick Center Rd.	Rural Arterial	6th Ave.	County Line Rd.	2	114
Broncos Pkwy.	Urban Arterial	Peoria St.	Parker Rd.	6	144
Buckley Rd.	Urban Arterial	Orchard Rd.	Arapahoe Rd.	4	114
Chenago Ave.	Urban Collector	Himalaya Rd.	Picadilly St.	4	114
Clinton St.	Urban Collector	Geddes Ave.	Dry Creek Rd.	4	114
Coal Mine Rd.	Urban Arterial	County line	Platte Canyon Rd.	4	114
Colfax Ave.	Rural Arterial	US 40	US 36	2	114
County Line Rd.	Rural Arterial	County line	Strasburg Rd.	2	114
County Line Rd.	Urban Arterial	Yosemite St.	I-25	8	168
Dry Creek Rd.	Urban Arterial	Yosemite St.	Havana St.	6	144
Easter Ave.	Urban Arterial	Havana St.	Peoria St.	6	144
Exmoor Rd.	Rural Arterial	US 36	County line	2	114
Florida Ave.	Urban Collector	County line	Dayton St.	2	76
Front St.	Urban Arterial	Main St.	Exmoor Rd.	2	114
Gun Club Rd.	Semi-Urban Arterial	6th Ave.	Jewell Ave.	4	114
Gun Club Rd.	Urban/Semi-Urban Arterial	Jewell Ave.	Aurora Pkwy.	6	144
Hampden Ave.	Urban Expressway	Lowell Blvd.	Santa Fe Dr.	6	144
Hampden Ave.	Urban Arterial	University	Colorado Blvd.	6	144
Hampden Ave.	Semi-Rural Arterial	Himalaya Way	Gun Club Rd.	4	114
Harvest Rd.	Semi-Urban Arterial	I-70	Jewell Ave.	4	114
Havana St.	Urban Collector	Arapahoe Rd.	Bellevue Ave.	2	76

Roadway	Classification	From	To	Proposed Lanes	ROW
Havana St.	Urban Arterial	Dry Creek Rd.	Arapahoe Rd.	6	144
Himalaya St.	Urban Collector	Quincy Ave.	Chenanqo Ave.	4	114
Iliff Ave.	Urban Arterial	Quebec St.	Parker Rd.	4 / 6 ⁽¹⁾	144
Inverness Dr. E.	Urban Collector	County Line Rd.	Lima St.	4	114
Inverness Dr. W.	Urban Collector	Dry Creek Rd.	County Line Rd.	4	114
Jewell Ave.	Rural Arterial	E-470	Powhaton Rd.	4	114
Jewell Ave.	Rural Arterial	Powhaton Rd.	Watkins Rd.	4	114
Jordan Rd.	Urban Arterial	Arapahoe Rd.	County line	4	114
Kiowa-Bennett Rd.	Rural Arterial	I-70	County Line Rd.	2	114
Knudtson Rd.	Rural Arterial	Strasburg Rd.	Exmoor Rd.	2	114
Lima St.	Urban Collector	Inverness Dr. E.	Arapahoe Rd.	4	114
Liverpool St.	Urban Collector	Smoky Hill Rd.	Arapahoe Rd.	4	114
Manila Rd.	Rural Arterial	I-70	County Line Rd.	4	114
Mineral Ave.	Urban Arterial	Platte Canyon Rd.	Polo Ridge Dr.	6	144
Mississippi Ave.	Urban Arterial	Parker Rd.	Alton St.	6	144
Mississippi Ave.	Urban Arterial	Alton St.	Havana St.	6	144
Mississippi Ave.	Semi-Urban Arterial	Gun Club Rd.	Harvest Rd.	4	114
Monaqhan Rd.	Rural Arterial	I-70	Jewell Ave.	2	114
Orchard Rd.	Urban Arterial	Buckley Rd.	Himalaya St.	4	114
Oxford Ave.	Urban Collector	Federal Blvd.	Santa Fe Dr.	4	114
Parker Rd.	Urban Arterial	Mississippi Ave.	Havana St.	4	114
Parker Rd.	Urban Expressway	I-225	Quincy Ave.	8	168
Parker Rd.	Urban Expressway	Quincy Ave.	Orchard Rd.	6	144
Parker Rd.	Urban Expressway	Orchard Rd.	Arapahoe Rd.	8	168
Parker Rd.	Urban Expressway	Arapahoe Rd.	County line	6	144
Peoria St.	Urban Arterial	Broncos Pkwy.	Arapahoe Rd.	4	114
Picadilly Rd.	Semi-Urban Arterial	Colfax Ave.	6th Ave.	6	144
Picadilly Rd.	Semi-Urban Arterial	6th Ave.	Jewell Ave.	6	144
Picadilly Rd.	Urban Arterial	Hampden Ave.	Chenanqo Ave.	4	114
Picadilly Rd.	Urban Arterial	Chenanqo Ave.	Smoky Hill Rd.	4	114
Platte Canyon Rd.	Urban Arterial	Ken Caryl Rd.	Coal Mine Ave.	4	114
Platte Canyon Rd.	Urban Arterial	Coal Mine Ave.	Bowles Ave.	4	114
Potomac St.	Urban Arterial	Broncos Pkwy.	Arapahoe Rd.	4	114
Potomac St.	Urban Arterial	Broncos Pkwy.	County line	4	114
Quebec St.	Urban Arterial	Cherry Creek Dr.	Iliff Ave.	4	114

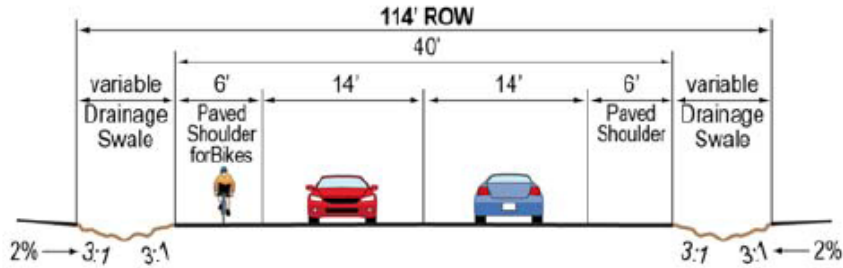
⁽¹⁾ Laneage to be determined from Corridor Study recommendations

Roadway	Classification	From	To	Proposed Lanes	ROW
Quincy Ave.	Urban Arterial	Picadilly Rd.	E-470	6	144
Quincy Ave.	Rural Arterial	E-470	Powhaton Rd.	6	144
Quincy Ave.	Urban Arterial	Powhaton Rd.	Watkins Rd.	6	144
Quincy Ave.	Rural Arterial	Watkins Rd.	Exmoor Rd.	2	114
SH 30	Semi-Urban Arterial	6th Ave.	Gun Club Rd.	2	114
Smoky Hill Rd.	Urban Arterial	Tower Rd.	Himilaya Rd.	6	144
Smoky Hill Rd.	Urban Arterial	Picadilly Rd.	E-470	6	144
Strasburg Rd.	Rural Arterial	I-70	County Line Rd.	2	114
Tower Rd.	Urban Collector	Waco St.	Smoky Hill Rd.	2	76
Waco St.	Urban Collector	Buckley Rd.	Arapahoe Rd.	2	76
Wabash St.	Urban Arterial	Syracuse Way	Iliff Ave.	2	114
Watkins Rd.	Urban Arterial	I-70	Quincy Ave.	6	144
Wolf Creek Rd.	Rural Arterial	6th Ave.	County line	2	114
Woodis Rd.	Rural Arterial	Quincy Ave. Extension	Deer Trail	2	114
Yale Ave.	Urban Arterial	I-25	Monaco Pkwy.	4	114
Yale Ave.	Urban Arterial	Quebec St.	Syracuse Way	2	114
Yale Ave.	Urban Collector	Monaghan	Watkins Rd.	2	76
Yosemite St.	Urban Collector	County line	Iliff Ave.	2	76
Yosemite St.	Urban Arterial	County Line Rd.	Dry Creek Rd.	4	114
Yulle Rd.	Semi-Urban Arterial	Colfax Ave.	6th Ave.	2	114

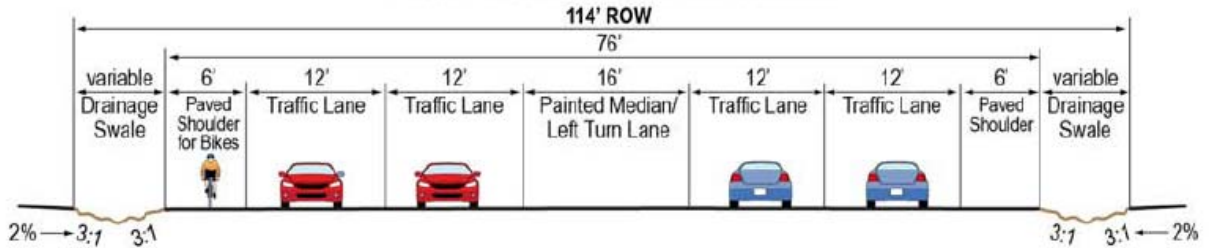
Rural Roadway Cross-Sections



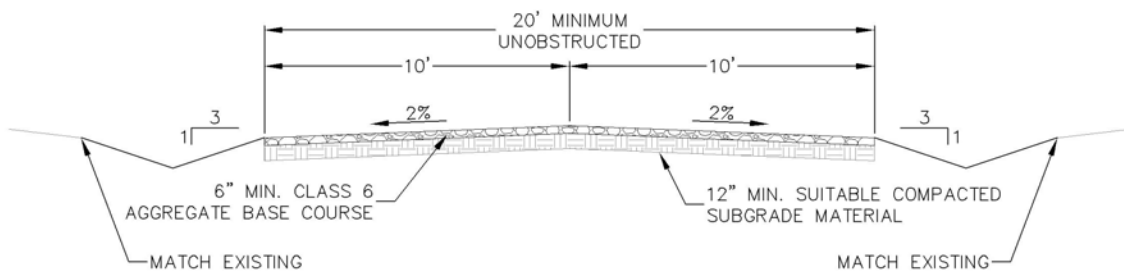
Two-Lane Rural Arterial with or without Bike Accommodations



Four-Lane Rural Arterial



PRIVATE ACCESS OR PRIVATE DRIVEWAY



Chapter 3. Drainage (Stormwater Management and Water Quality Requirements)

The Arapahoe County Stormwater Management Manual (ACSWMM) sets drainage engineering criteria for developments in both the urban and rural areas of Arapahoe County. This includes design and evaluation of storm sewer systems, culverts, bridges, analysis and design methodology for drainageways, development near floodplains, evaluation of stormwater conveyance, and the design of post-construction stormwater quality facilities, to name a few.

The intent of this section is not to take precedence over Arapahoe County's Stormwater Management Manual, but is to supplement it for the Rural Area of unincorporated Arapahoe County that do not necessarily fall under that criteria, mainly those residential areas where additions or site expansions occur (excluding associated driveways) within areas not subdivided that include a total impervious area of less than 10,000 square feet.

Section 3.01 - Existing Exemptions within the County's Stormwater Management Manual

The ACSWMM includes several exemptions or variances to its detention and water quality criteria if certain requirements are met. These are described in the following table:

Existing ACSWMM Exemptions

	Granted for
Exemption from Detention Requirement	<ul style="list-style-type: none">• Additions to existing buildings and paved areas, provided that the total impervious area of all additions (cumulative over the history of the site expansions) cover less than 5,000 square feet of impervious area and that no adverse impacts to downstream properties would be created by the additional undetained runoff.• Subdivisions which have individual residential lots that are 19 acres or larger in area, if it can be demonstrated that the development does not create adverse impacts on adjacent properties, and there are not existing drainage problems which may be exacerbated. It may be necessary for the applicant to provide analyses to demonstrate that the subdivision release rates will not cause downstream impacts
Exemption from Water Quality Requirement	<ul style="list-style-type: none">• Projects with a total imperviousness less than 10-percent for any given acre• Subwatershed areas less than 0.5-acre draining off of a site

Section 3.02 - Rural Residential Detention Requirement

From the previous Section, it would generally appear that parcels in the A-1 and A-E zoning districts are exempt from the detention requirement since the minimum parcel size for an A-

1 parcel is 19 acres and the minimum size for an A-E parcel is 35-acres. However, there may be situations where there are documented drainage problems or where a development's proximity to a drainageway and/or drainage tributaries could cause adverse impacts. It is for these instances that a modified detention requirement is warranted.

It would be appropriate to keep the same requirements for those rural areas that do not meet existing exemptions. However, the detention requirement will be modified to specifically address the rural character of Arapahoe County's eastern community. That is, increasing the allowed impervious surface to 10,000 square feet of new impervious area where residential additions or site expansions occur (excluding associated driveways) on unsubdivided parcels.

The current ACSWMM requires both rural and urban developments to provide stormwater detention storage for all new development, redevelopment, or expansion with more than 5,000 square feet of new impervious area unless an exemption is granted. Increasing the amount of new impervious area to 10,000 square feet and evaluating the distances from any major drainageway and/or its tributaries will allow Staff more flexibility when determining whether a site should provide on-site detention storage. However, regardless of size, if illicit discharges are present, they must be mitigated.

Section 3.03 - Drainage Crossings

Please refer to Appendix R, Section AR102.3 Drainage Crossings for crossing criteria.

Section 3.04 - Elevation Certificates and/or Floodplain Analysis

In 1968, the U.S. Congress passed the National Flood Insurance Act, which created the National Flood Insurance Program (NFIP). The NFIP was designed to reduce future flood losses through local floodplain management and to provide protection for property owners against potential losses through flood insurance.

As part of the agreement for making flood insurance available in a community, the NFIP requires the participating community to adopt floodplain management ordinances containing certain minimum requirements that are intended to reduce future flood losses. The NFIP regulations for floodplain management are the minimum criteria a community must adopt for participation in the NFIP. One such requirement is for the community to obtain the elevation of the lowest floor (including basement) of all new and substantially improved buildings, and maintain a record of such information. The Elevation Certificate provides a way for a community to document compliance with the community's floodplain management ordinance.

In order for Arapahoe County to participate in the NFIP Community Rating System (CRS), elevation certificates for all new and substantially improved buildings must be required and maintained. Arapahoe County utilizes the Federal Emergency Management Agency (FEMA) Elevation Certificate (FEMA Form 81-31) for floodplain review of building permit applications for parcels or property along/near major drainageways. Elevation Certificates are also an important administrative tool of the NFIP. They are used to determine the proper insurance premium rate, to provide elevation information necessary to ensure

compliance with community floodplain management regulations, and to support a request for a Letter of Map Amendment (LOMA) or Letter of Map Revision based on fill (LOMR-F).

When the owner of a parcel or property applies for a building permit and the County has determined that the application is along or near a major drainageway, the County will inform the applicant that an Elevation Certificate is required. The County may also request that floodplain information such as approximate hydrology and hydraulics be provided.

[Remainder of page intentionally left blank]

Chapter 4. Grading, Erosion, and Sediment Control

Erosion is the process by which the surface of the earth is worn away by the action of wind, water, ice, gravity, etc. Removal of surface vegetation and disturbance of the soil surface accelerates this process. Sediment is the result of erosion and consists of soil, chemicals, and/or debris. The removal of surface vegetation and disturbance of surfaces displace soil particles that are easily transported from the site and may affect water and air quality. The Arapahoe County Grading, Erosion, and Sediment Control (GESCC) Manual sets grading, erosion, and sediment control standards for developments in both the urban and rural areas of Arapahoe County. This includes new development and redevelopment of all sites (regardless of size).

The intent of this section is not to take precedence over Arapahoe County's Grading, Erosion, and Sediment Control Manual, but is to supplement it for those rural residential areas as defined by this Standard that are outside of the County's municipal separate storm sewer systems (MS4) boundary where construction disturbance is equal to or greater than one acre.

Section 4.01 - Regulation History

In 1972, the United States Congress adopted the Clean Water Act. The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point source discharge of pollutants. The Clean Water Act (CWA) also authorizes the Environmental Protection Agency (EPA) to establish water quality standards for any state that fails to adopt standards that meet the CWA and also required states to develop a comprehensive and continuing planning process for water quality management.

In 1973, the Colorado Water Quality Control Act was rewritten to be in compliance with the CWA. Because the State of Colorado developed a program that meets the requirements of the CWA, the primary discharge permit program in Colorado is administered by the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division, rather than the EPA. A two-phase approach was established to implement the NPDES program for stormwater discharges. Phase I of the NPDES program affected MS4s serving a population greater than one hundred thousand (100,000). Phase II of the NPDES program affected MS4s serving a population less than one hundred thousand (100,000). The Colorado Program is referred to the Colorado Discharge Permit System, or CDPS, instead of NPDES. Arapahoe County is included in the Phase II regulations as published in the Colorado Water Quality Control Act Regulation 61 under Stormwater Construction Permit COR-080010.

The State of Colorado holds a permit for areas outside of MS4 boundary areas under Regulation 61, as amended. In compliance with the provisions of the Colorado Water Quality Control Act, (25-8-101 et seq., CRS 1973 as amended) and the Federal Water Pollution Control Act, as amended (33 U.S.C 1251 et seq.; the "Act"), this permit authorizes the discharge of the stormwater associated with construction activities certified under Stormwater Construction Permit COR-030000 (hereafter known as CDPS Stormwater Construction Permit). This permit authorizes the discharge of stormwater associated with

construction activities. State and Federal regulations require any construction activity for new development or redevelopment projects that disturb an area greater than or equal to one acre, including projects less than one acre that are part of a larger “common plan of development or sale” to obtain coverage under the State’s general CDPS Stormwater Construction Permit. A “common plan of development or sale” is described in the next section.

However, the County is still responsible for protecting water quality and satisfying the appropriate water quality requirements of the Colorado Water Quality Control Act even outside of its MS4 boundary. The following shall be regarded as the minimum rural, residential GESC requirements for the protection of the public health, safety, and welfare of the residents of the County outside of its MS4 boundary.

Section 4.02 - Residential development outside the County’s MS4 Permit Area

As previously stated, the CDPHE is the issuing authority of the CDPS Stormwater Construction Permit. Construction activities with the authority to discharge under the CDPS Stormwater Construction Permit consist of ground surface disturbing activities, which include, but are not limited to, clearing, grading, excavation, demolition, installation of new or improved haul roads and access roads, staging areas, stockpiling of fill materials, and borrow areas that result in land disturbance equal to or greater than one acre. Construction does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility. Construction activity also includes the disturbance of less than one acre of total land area that is part of a larger “common plan of development or sale”, if the larger common plan will ultimately disturb an area equal to or greater than one acre. A “common plan of development or sale” is a site where multiple separate and distinct construction activities may be taking place at different times on different schedules, but still under a single plan. This includes phased projects, projects with multiple filings, lots, or parcels, and projects in a contiguous area that may be unrelated but still under the same contract. If the project is part of a “common plan of development or sale”, the disturbed area of the entire plan must be used in determining permit requirements, and all portions of the project must be covered.

It is the intent of these Standards to utilize the CDPS Stormwater Construction Permit outside of the County’s MS4 boundary in combination with the current GESC Manual for rural residential developments in the A-1 and A-E zoning districts.

Section 4.03 - Method of Compliance

This section specifically includes rural residential construction activities that disturb one acre of land or more. Rural residential construction activities that are part of a larger common plan of development which disturb one acre or more over a period of time are also included.

Prior to any land disturbance and/or building construction activity, and prior to receiving an Arapahoe County GESC Permit, the applicant must apply for and implement a Colorado Department of Public Health and Environment (CDPHE) Colorado Discharge Permit

System (CDPS) COR-030000. This form can be found at <http://www.cdphe.state.co.us/wq/PermitsUnit/>

A Stormwater Management Plan is a required item under the CDPS Stormwater Construction Permit. However, the County's Grading, Erosion, and Sediment Control Plan is similar to a Stormwater Management Plan. A Grading, Erosion, and Sediment Control (GESC) Plan in accordance with the County's GESC Manual meets or exceeds CDPHE requirements and will be required to receive a Arapahoe County GESC permit. The main purpose of the GESC plan is to improve water quality by reducing pollutants in stormwater discharges from construction sites by describing and ensuring implementation, maintenance and inspection of best management practices (BMPs) which, when implemented, will meet the terms and conditions of the CDPS Stormwater Construction Permit.

Construction or GESC Permits will not be issued until a copy of the State Permit CDPHE approval letter, certification page, and a County GESC Plan is on file with the Department of Public Works and Development –Engineering Services Division. Under the NPDES Phase II regulations, Arapahoe County is required to ensure compliance with the Construction Site Stormwater Runoff Control Minimum Control Measure. The method by which Arapahoe County will ensure that all construction activities are complying with Arapahoe County's MS4 Permit and CDPS Stormwater Construction Permit is through the development, inspection, and enforcement of the GESC Plan.

It is recommended that the applicant submit an application for permit to CDPHE in conjunction with submitting a GESC plan to the County. The CDPHE will take approximately ten (10) days to process the application. During that time, the County will review the GESC plan. Once the approved permit is received from CDPHE, the applicant shall provide the County a copy of the State Permit - the approval page(s) and the certification page(s) – and the final copy of the GESC Plan intended for the State Permit. Once items are verified, the Department of Public Works and Development –Engineering Services Division will release the County GESC Permit with the provision that all other necessary documents have been approved. Approval of the GESC does not imply acceptance or approval of Building Permit, design of retaining walls, or any other County required permit. Applicants are encouraged to prepare the required submittals with as much detail as possible to minimize confusion and reduce the overall processing time.

Utilizing the above will minimize the duplication of documentation a developer would be required to submit to meet State and County requirements outside of the County's MS4 boundary while protecting water quality of the eastern area of the County.

Additional information may be required for projects where the County deems that erosion, sedimentation or stormwater quality control problems will not be adequately handled by the submitted GESC. Such data may include, but not be limited to, other engineering studies, computations, schedules, and supportive data such as product design information and specifications as deemed necessary by the County.

Section 4.04 - Residential areas that create less than one acre of disturbance

For areas where construction disturbance is less than one acre and dependent upon the distance from any major drainageway and/or tributaries, the current Low-Impact GESC requirements as defined in the Arapahoe County Grading, Erosion, and Sediment Control Manual will be utilized.

Section 4.05 - Performance Objectives

The overall goal of these stormwater pollution prevention measures that will be implemented during construction is to minimize the amount of sediment and pollutants transported offsite by stormwater runoff from construction sites to the maximum extent practicable.

The following objectives shall be met in order to attain this goal:

- i. Conduct all land disturbing activities in a manner that effectively reduces accelerated soil erosion and reduces sediment movement and deposition offsite.
- ii. Schedule construction activities to minimize the total amount of soil exposed at any given time to reduce the period of accelerated soil erosion.
- iii. Establish temporary stabilization measures prior to initial grading and permanent stabilization measures on areas that have been disturbed as soon as possible after final grading is completed.
- iv. Design and construct all temporary and permanent facilities for the conveyance of water around, through, or from the disturbed area to limit the flow of water to non-erosive velocities.
- v. Remove sediment caused by accelerated soil erosion from surface runoff water before it leaves the site.
- vi. Stabilize the areas of land disturbance with permanent vegetative cover or stormwater quality control measures.
- vii. Implement BMPs relating to materials storage and waste management to minimize impacts to stormwater quality.

The modified GESC requirements for residential areas as defined by this Standard still meet federal and state mandated requirements and better suit the rural character of Arapahoe County's eastern community.

Section 4.06 - Other Items

Arapahoe County field inspection personnel shall be able to mandate additional erosion protection during construction if it is determined that the construction site lacks sufficient erosion and sediment control protection, or if field conditions require corrective action.

Appendix R

Regulations Governing Access and Driveways

New Appendix to the Arapahoe County Building Code

SECTION AR101 - GENERAL	1
AR101.1 Short Title.....	1
AR101.2 Purpose.....	1
AR101.3 Scope.....	1
AR101.4 Amendments and Revisions	2
AR101.5 Enforcement Responsibility	2
AR101.6 Review and Approval	2
AR101.7 Relationships to Other Standards	2
AR101.8 Variances, Waivers and Appeals	2
SECTION AR102 - REQUIRED ACCESS.....	3
AR102.1 Access surface.....	3
AR102.2 Air Quality	4
AR102.3 Drainage Crossings	4
AR102.4 Easements	4
SECTION AR103 - MINIMUM SPECIFICATIONS	5
AR103.1 Approved materials	5
AR103.2 Used materials and equipment	5
AR103.3 Number of Entries	5
AR103.4 Location of Entry	5
AR103.5 Proximity to Building	5
AR103.6 Width of Access or Driveway	6
AR103.7 Maximum and Minimum Grades	6
AR103.8 Cross slope	6
AR103.9 Turning radius	6
AR103.10 Dead ends.....	6
SECTION AR104 - PERMITS	7
AR104.1 Required	7
AR104.2 Authorization	7
AR104.3 Submittal Requirements.....	8
SECTION AR105 - CERTIFICATION AND ACCEPTANCE	8
AR105.1 Access and Driveways.....	8
AR105.2 Certification Statement.....	9
SECTION AR106 - MAINTENANCE	9
AR106.1 Private Access and Driveways.....	9
AR106.2 Private Drainage	9
SECTION AR107 - PREMISES IDENTIFICATION	10
AR107.1 Address numbers.....	10
AR107.2 Residential dwellings	10
AR107.3 Streets and roads.....	10

SECTION AR101 - GENERAL

AR101.1 Short Title

This appendix, together with all future amendments, shall be known as the Arapahoe County Regulations Governing Access and Driveways (hereinafter referred to as 'Appendix R') and is adopted by resolution and incorporated by reference as part of the Arapahoe County Building Code adopted pursuant to the authority as set forth in Section 30-28-201, et seq., C.R.S., as amended.

AR101.2 Purpose

In addition to the purposes set forth in Section 30-28-203, C.R.S., this Appendix R is intended to provide providers of emergency services including fire fighting, law enforcement, ambulance, emergency medical, or other emergency services an adequate means of access in order to protect the public health, safety, and welfare of people and communities of unincorporated Arapahoe County from damage, injury, and loss of life and property resulting from natural catastrophes, catastrophes of human origin, civil disturbance, or other dangers. It is the intent of this Appendix R that No Certificate of Occupancy shall be issued for new residential buildings in the A-1 and A-E Zone Districts, as defined by the Arapahoe County Land Development Code, unless the required access and/or driveway criteria as defined by this Appendix have been met.

AR101.3 Scope

This Appendix R applies to all means of access, publicly or privately owned, whether or not they are designated as public roadways. This Appendix R also applies to all new residential buildings or new portions of building used or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, and shall include additions thereto.

This Appendix R, which stipulates certain minimum conditions for access and driveways, shall apply to all parcels proposed for residential uses within unincorporated Arapahoe County in zoning districts A-E and A-1 east of Watkins Road (CR-97). More specifically, any A-1 and A-E zoning districts within the areas east of the Watkins Road alignment extended south to the Arapahoe County and Elbert County border. The area would include the extent east to the Arapahoe County and Washington County border.

GRAPHIC TO BE ADDED

Access and driveways shall be in accordance with this appendix and all other applicable requirements of the Arapahoe County Infrastructure Design and Construction Standards unless exempted by this Appendix. If the access or driveway is on a State Highway, it shall be in accordance with the State Highway Access Code, as amended, and a Colorado Department of Transportation (CDOT) State Highway Access Permit is required.

The County recognizes that existing unimproved parcels that utilize accesses placed prior to the adoption of this Appendix R do exist. Access roads placed prior to the adoption of this Appendix R and these Standards may be exempt for existing improved parcels depending on their location and the number of homes utilizing the access. Existing unimproved parcels requiring a building permit that utilize access roads placed prior to the adoption of this Appendix R will be required to comply with this Appendix R unless a variance from the access road improvement requirements is granted. However, the County

will still require access and/or driveway placement for existing unimproved parcels that directly access a County maintained roadway. Driveways to those existing unimproved parcels will be required to comply with the regulations set forth in this Appendix R and these Standards.

Existing buildings affected by this Appendix R are not required but are encouraged to comply with SECTION AR107 - PREMISES IDENTIFICATION.

AR101.4 Amendments and Revisions

This Appendix R may be amended from time to time as new technology is developed and/or the experience gained in the use of this Appendix indicates a need for revision. Technical Modifications to this Appendix shall be approved by the Director of the Department of Public Works and Development. Policy changes within this Appendix shall be approved by the Arapahoe County Board of County Commissioners (BOCC), following the recommendations of the Director of the Department of Public Works and Development (or the Director's named representative). Minor revisions that provide additional clarity and/or reflect reformatting and do not affect technical or policy modifications may be made without the action of the Director or the BOCC. The Director of the Department of Public Works and Development shall monitor the performance and effectiveness of this Appendix and will recommend changes, amendments or revisions, as needed.

AR101.5 Enforcement Responsibility

It shall be the duty of the Director of the Department of Public Works and Development (PWD), or the Director's named representative, acting on behalf of the BOCC to enforce the provisions of this Appendix R. No building permit shall be issued without the items identified under Section AR104.3 Submittal Requirements and No Certificate of Occupancy shall be issued for any residential property zoned A-1 or A-E, as defined in Section AR101.3 above, unless the access and/or driveway comply with this Appendix R.

AR101.6 Review and Approval

The County shall review all submittals for general compliance to this Appendix R. Approval by the County does not relieve the owner, engineer, or designer from responsibility of insuring that the submittal is in compliance with this Appendix R and/or all other applicable County Standards.

AR101.7 Relationships to Other Standards

If the State or Federal Government imposes more stringent standards, criteria, or requirements, these may be incorporated into this document after due process and public hearing(s), if needed, to modify the County's Regulations and Standards and this Appendix.

AR101.8 Variances, Waivers and Appeals

AR101.8.A Variances and Waivers

Whenever there are difficulties involved in carrying out the provisions of this Appendix R a variance or waiver request(s) with appropriate documentation and justification shall be submitted to the Building Official. The Building Official shall have the authority to grant modifications for individual cases, provided the Building Official shall first find that specific individual reason(s) makes the strict letter of this criteria impractical and the modification is in compliance with the intent and purpose of these criteria and provided

that such modification does not lessen health, life, and/or emergency safety requirements.

The request(s) are required to be identified with the initial application of a building permit. The request(s) shall consist of:

- ◆ Identification of the criteria requested to be waived or varied
- ◆ Justification for not complying with the criteria
- ◆ Identification of the alternative design or construction that is proposed to comply with the intent of the criteria
- ◆ Any supporting documentation, graphic(s), calculation(s), etc

In the event that the Building Official requires assistance in determining the result of a request, the Building Official shall refer these requests to the Technical Review Committee (TRC) or the Board of Review, as applicable, for review and recommendation.

If the Building Official refers a request to the Board of Review or the TRC, any special district involved shall also receive a copy of the request for their review and recommendation.

The details of action granting variances and/or waivers shall be entered into the files of the Building or Engineering Services Division, as applicable.

AR101.8.B Appeal of Variance Decisions

If the Building Official, Board of Review, or the TRC denies a variance or waiver request(s), the applicant may appeal the decision. The appeal process is as follows:

- ◆ Appeal to the Director, Department of Public Works and Development

The applicant may appeal to the Director of the Department of Public Works and Development (Director) within six (6) working days of receipt of an unfavorable Building Official, Board of Review, or TRC recommendation. This appeal shall be addressed to the Director and submitted to the Building Official. A response will be issued to the applicant in writing, defining a date, time and location at which the applicant may present his/her appeal. The date of the meeting will not be more than twelve (12) working days from the date of receipt of the written appeal.

At the appeal meeting, it shall be the responsibility of the applicant to clearly define and justify the variance or waiver requested. Staff shall be responsible for presenting the reasons and basis for denying the original variance request.

The Director will provide a written recommendation to the applicant within five (5) working days of the appeal meeting.

SECTION AR102 - REQUIRED ACCESS

AR102.1 Access surface

Facilities, buildings or portions of buildings hereafter constructed shall be accessible to emergency response vehicles by way of an approved access and driveway surfaced with asphalt, concrete or other County approved all-weather driving surface.

AR102.2 Air Quality

Construction of any new unpaved access shall be limited to serve nine (9) or fewer dwelling units.

Accesses serving ten (10) or more dwelling units in any development shall be paved in order to attain and maintain Colorado's ambient air quality standards. The pavement shall meet the County's private roadway standards per the County's Infrastructure Design and Construction Standards.

The Colorado Air Pollution Prevention and Control Act (Colo. Rev. Stat. § 25-7-100, et seq.) governs ambient air quality and air pollution in Colorado. Rules and regulations consistent with the implementation of the Air Pollution Prevention and Control Act are promulgated by the Colorado Department of Public Health and Environment and the Air Quality Control Commission.

AR102.3 Drainage Crossings

Accesses and driveways crossing major drainageway conveyances as defined by this Appendix shall conform to the Arapahoe County Stormwater Management Manual, as amended.

In larger watershed areas, less than 130 acres but larger than 90 acres of tributary area, the County recommends that the applicant consult with a licensed Colorado Professional Engineer to obtain the appropriate culvert diameter in order to minimize overtopping of the access or driveway.

For all other drainageway crossings, including those crossing any roadside ditch, a culvert shall be installed at the established flowline elevation under the access or driveway. The culvert shall be a minimum of eighteen (18) inches in diameter, consist of a minimum of sixteen (16) gauge corrugated metal pipe, and include flared end sections on each end of the culvert.

All culverts shall have a minimum cover of six (6) inch compacted Colorado Department of Transportation (CDOT) Class 6 aggregate base course and be a minimum of twenty-four (24) feet in length. Additional cover may be required if heavy vehicles will utilize the crossing.

The slope, capacity, and flowline elevation of any drainageway and/or roadside ditch impacted by the construction of a drainage crossing shall be maintained.

AR102.4 Easements

Easements for accesses are required. An access easement over the access to the benefit of and demonstrating access to all parcels that are utilizing said access shall be recorded with the Clerk & Recorder of Arapahoe County prior to County Street Cut & Right-of-Way Use Permit issuance.

County Engineering Services Division Staff can provide standard language for the access easement; however, if other language is utilized, grant of access to emergency service vehicles must be specified.

Easements for individual driveways serving one parcel are not required.

SECTION AR103 - MINIMUM SPECIFICATIONS

AR103.1 Approved materials

Regardless of material used for surfacing, accesses and/or driveways shall be placed on a minimum of twelve (12) inches of suitable compacted subgrade material, see Section AR105.1.A below for more information.

The width of the subgrade material shall be the same as the width of the proposed access and/or driveway.

AR103.1.A Asphalt (Hot Mix Asphalt Pavement)

Any asphalt surface shall conform to the Arapahoe County Infrastructure Design and Construction Standards Chapter 5, as amended.

AR103.1.B Concrete

Any concrete surface shall conform to the Arapahoe County Infrastructure Design and Construction Standards Chapter 5, as amended.

AR103.1.C All-weather surface

An all-weather driving surface shall be a minimum of six (6) inches of compacted Colorado Department of Transportation (CDOT) Class 6 aggregate base course meeting gradation, compaction, and all other requirements per CDOT Standard Specifications for Road and Bridge Construction, or approved equivalent, when the material, thickness, and placement are certified and bear the stamp of a licensed Colorado Professional Engineer.

AR103.2 Used materials and equipment

Used materials, equipment, and devices shall not be reused unless approved by the County.

AR103.3 Number of Entries

No more than one access shall be provided to an individual parcel or to contiguous parcels under the same ownership if the parcel proposes access to a County maintained public roadway unless it can be shown that; (1) allowing only one access conflicts with safety regulations (i.e. local Fire District requirements), or (2) additional access would significantly benefit safety and operation of the roadway and is necessary to the safe and efficient use of the property.

AR103.4 Location of Entry

When a property has frontage on two roadways, the driveway shall be located on the lower volume road, as determined by the County.

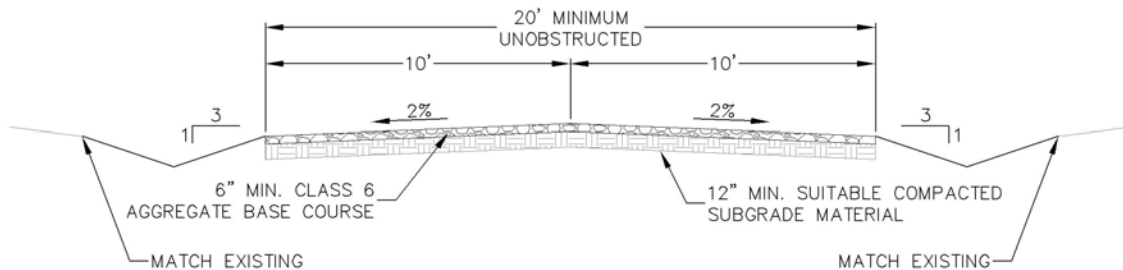
AR103.5 Proximity to Building

One required access or driveway meeting this Appendix R shall be placed within fifteen (15) feet of the building and a maximum of thirty (30) feet from the building.

AR103.6 Width of Access or Driveway

Accesses and driveways shall have a minimum unobstructed width of twenty (20) feet, as shown in Figure AR103.6-1.

FIGURE AR103.6-1 PRIVATE ACCESS OR PRIVATE DRIVEWAY



AR103.7 Maximum and Minimum Grades

Accesses shall not exceed seven (7) percent in grade.

Driveways shall have a minimum grade of not less than one-half (0.5) percent in order to prevent pooling within private property.

Accesses shall have a minimum grade of not less than one (1) percent in order to prevent pooling of water in the traffic lane.

Access and driveway slopes shall be $\pm 2\%$ for a minimum of five (5) feet from the edge of any existing County maintained roadway. This distance may vary if access is proposed from a County classified Arterial roadway.

AR103.8 Cross slope

Accesses and driveways shall be crowned in the center with a minimum cross slope of 2% to each edge.

The crown of a driveway may vary as it approaches the building.

AR103.9 Turning radius

The minimum turning radius at access centerline shall be a minimum of one hundred (100) feet.

AR103.10 Dead ends

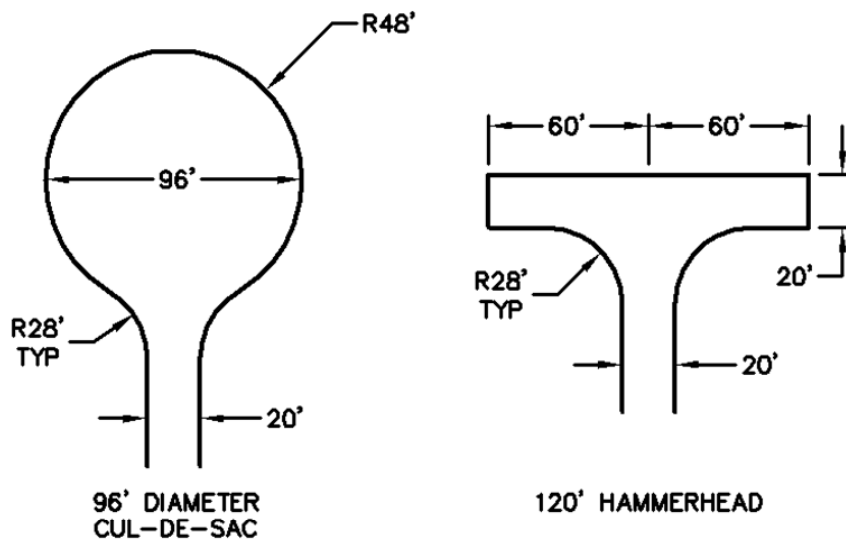
Dead-end accesses and/or driveways in excess of 150 feet shall be provided with width and turnaround provisions in accordance with Table AR103.10-1. However, an unpaved gravel access in excess of 750 feet may be permitted if the access serves nine (9) or fewer dwelling units and a turnaround per Figure AR103.10-1 is provided.

TABLE AR103.10-1 REQUIREMENTS FOR DEAD-ENDS

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0-150	20	None required
151-750	20	120-foot Hammerhead or 96-foot-diameter cul-de-sac in accordance with Figure AR103.10-1
751-1,200	Extended lengths beyond 750 feet may be permitted only with input from the affected Fire Protection District and approval by the Building Official.	
Over 1,200	Not allowed**	

**Dead ends over 1,200-feet are not allowed for newly proposed residential use parcels unless a variance is submitted and approved. Existing unimproved parcels with dead ends over 1,200-feet long will be allowed to remain, but may be subject to the turnaround requirement as determined by the local fire district.

FIGURE AR103.10-1 DEAD-END ACCESS AND/OR DRIVEWAY TURNAROUND



SECTION AR104 - PERMITS

AR104.1 Required

Any owner or authorized agent who intends to construct, enlarge, move, demolish, or change the occupancy of a building, the installation of which is regulated by this Appendix, or to cause any such work to be done, shall first make application to the Building Official and obtain the required permit.

AR104.2 Authorization

Permitting for, and enforcement of, this regulation is administered by the Arapahoe County PWD. Arapahoe County PWD will ensure that the final design of the access and/or

driveway meets the minimum requirements for reasonable emergency access, safety, and the protection of soil and water natural resources, which may include consultation with the special district(s) involved.

In cases where an access or driveway does not meet the minimum requirements or where a traffic hazard is created, a permit may be denied.

AR104.3 Submittal Requirements

When applying for a Building Permit, the following should be included:

- A sketch plan defining the limits of construction and the following items:
 - ◆ Location, dimension, and approximate square footage of proposed building
 - ◆ Location and dimension length of proposed access or driveway with proposed drainage features such as culverts also labeled and dimensioned
 - ◆ Typical cross-section of the proposed access or driveway showing width, depth of surfacing materials, and sub-grade treatment
 - ◆ Location of any existing right-of-way, buildings, structures, drainageways, wetlands, or drainage features within 100 feet of the work or that may be affected by the proposed work
- Street Cut and Right-of-Way Use Permit Application

SECTION AR105 - CERTIFICATION AND ACCEPTANCE

AR105.1 Access and Driveways

Sufficient guarantee must be given in the form of test reports, field reports, and drawings in conformance with the requirements of this Appendix R (including geo-technical data, road base thickness, sub-grade moisture content, density, and compaction reports, as required).

All submittals relating to the construction of accesses and driveways shall be submitted to Arapahoe County for review and acceptance, prior to release of a Certificate of Occupancy. If the access or driveway is on a State Highway, a CDOT State Highway Access Permit is required.

AR105.1.A Sub-grade Testing

Subgrade shall be scarified to a minimum depth of 12-inches below finished grade. The subgrade shall be free of roots, sod, weeds, wood, construction debris, ice, snow, or other frozen materials, deleterious matter, and stones larger than 3 inches.

Subgrade shall be adjusted to a suitable moisture content and compacted.

Field moisture-density tests using acceptable methods will be required at random locations at the rate of one for each 500 lineal feet of sub-grade for each travel lane. At a minimum, two (2) tests for sub-grade will be required.

AR105.1.B Aggregate Testing

Aggregate Base Course materials shall be placed on an approved sub-grade found to be stable and non-yielding. Should weather conditions change, such as freezing, precipitation, etc., aggregate base materials shall not be placed until the sub-grade is reapproved.

At least one sample of aggregate base course for each 1,000 tons of materials placed shall be tested to determine gradation and Atterberg limits. Should this test indicate the material does not meet specifications; the material shall be removed and replaced.

During placement and compaction, Compaction Curves will be required for each material used. Field moisture-density tests shall be taken of each lift of material at random locations at approximate intervals of 500 feet in each travel lane. At a minimum, two (2) tests for aggregate will be required.

AR105.2 Certification Statement

As stated in Section AR103.1.C of this Appendix R, a certification and stamp of a licensed Colorado Professional Engineer (CO PE) for an all-weather driving surface shall be provided. A Certification Statement is required on any submittal certified by the CO PE and shall state the following:

As the licensed Colorado Professional Engineer responsible for inspection of the materials and the construction of the access and/or driveway at (Include address and permit number), I hereby certify under penalty of perjury that:

- ◆ The subgrade prepared for said access and/or driveway meets the minimum twelve (12) inch thickness, required width, and conforms to requirements as defined and specified in Appendix R of the Arapahoe County Residential Building Code, as amended.
- ◆ The aggregate used for said access and/or driveway meets the requirements as defined and specified in the latest edition of the "Colorado Department of Transportation Standard Specifications for Road and Bridge Construction", or approved equivalent.
- ◆ The construction of said access and/or driveway meets the minimum six (6) inch thickness.

SECTION AR106 - MAINTENANCE

AR106.1 Private Access and Driveways

The property owner shall be responsible for maintenance of all on-site access and/or driveways.

On State Highways, the owner is responsible for maintenance of access from the back of pavement, including drainage swales.

AR106.2 Private Drainage

All private drainage improvements within County right-of-way, including piping, are the responsibility of the adjoining property owner. The County will not provide maintenance of these items.

Should the owner fail to maintain said drainage improvements, the County shall have the right to enter the property for the purposes of operation and maintenance and assess the costs for such maintenance to the property owner.

SECTION AR107 - PREMISES IDENTIFICATION

AR107.1 Address numbers

New buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from a public way fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Address numbers shall be maintained by the property owner.

AR107.2 Residential dwellings

All new residential dwellings shall display a reflective street number in a prominent location on the parcel's dwelling (if that dwelling is clearly visible from the private access or public way) in such a position that the number is easily visible to approaching emergency vehicles. If the house number is located on the garage wall, it shall be on the wall closest to the front entrance. If the parcel's dwelling is not clearly visible from the private access or public way, the reflective street number should be placed near the dwelling's point of access in a location such as a monument, pole, fence, or other sign that is clearly visible to approaching emergency vehicles and is not within County right-of-way.

AR107.3 Streets and roads

Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an approved size, weather resistant and be maintained until replaced by permanent signs. Permanent signs shall conform to the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest County accepted edition. As editions of the MUTCD change, the County must choose to adopt those changes before used as regulation. Please contact the PWD Department for the latest edition of the MUTCD adopted by the County.

References

1. Arapahoe County Subdivision Ordinance Land Development Code, as amended
2. Arapahoe County Infrastructure Design and Construction Standards, as amended
3. Arapahoe County Grading, Erosion, and Sediment Control Manual, as amended
4. Arapahoe County Stormwater Management Manual, Prepared for Arapahoe County by Muller Engineering, Inc., Denver, Colorado, as amended
5. A Policy on Geometric Design of Highways and Streets, 2004, American Association of State Highway and Transportation Officials
6. Floodplain Management Bulletin Elevation Certificate, May 2004, US Department of Homeland Security, Federal Emergency Management Agency
7. Adams County Development Manual, Zoning and Subdivision Regulations, Engineering, Access, and Drainage Standards, October 2008, Adams County Colorado
8. Larimer County Urban Area Street Standards, April 2007, Larimer County Colorado
9. Roadway Design and Construction Standards, May 2011, Douglas County, Colorado
10. Douglas County – Wildfire Mitigation Standards, May 2011, Douglas County, Colorado
11. Arapahoe County 2035 Transportation Plan, November 2010, Prepared for Arapahoe County by David Evans and Associates Inc.
12. Arapahoe County Open Space Master Plan, Final Plan Report, June 2010, Prepared for Arapahoe County by Greenways Incorporated
13. State of Colorado State Highway Access Code, March 2002, Colorado Department of Transportation
14. AASHTO Roadside Design Guide, 4th Edition 2011, American Association of State Highway and Transportation Officials
15. Colorado Water Quality Management and Drinking Water Protection Handbook, November 2006, Water Quality Control Division and Commission, Colorado Department of Public Health and Environment
16. Colorado's Stormwater Program Fact Sheet, February 2008, Colorado Department of Public Health and Environment, Water Quality Control Division – Stormwater Program
17. Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 61, Colorado Discharge Permit System Regulations, as amended
18. Stormwater Discharges Associated with Construction Activity, General Permit Application and Stormwater Management Plan Preparation Guidance, July 2007, Colorado Department of Public Health and Environment, Water Quality Control Division – Stormwater Program
19. 2009 International Fire Code, International Code Council, Inc.
20. 2012 International Fire Code, International Code Council, Inc.
21. Regulation No. 1, Emission Control for Particulate Matter, Smoke, Carbon Monoxide, and Sulfur Oxides, Department of Public Health and Environment, Air Quality Control Commission

Glossary

For the purpose of Appendix R and the Rural Engineering Standards, the following words, terms, or abbreviations have the meanings shown below:

Access

Principal vehicular ingress and egress to a building or through a development, crossing more than one parcel, including public and private roads, streets, and access that extend to and intersect with a publicly maintained road, street, or access.

Agent

A person who shall have charge, care or control of any structure as owner, or agent of the owner, or as executor, executrix, administrator, administratrix, trustee or guardian of the estate of the owner. Any such person representing the actual owner shall be bound to comply with the provisions of this Standard to the same extent as if that person were the owner.

Air Pollutant

Any fume, smoke, particulate matter, vapor, gas, or any combination thereof that is emitted into or otherwise enters the atmosphere, including, but not limited to, any physical, chemical, biological, radioactive (including source material, special nuclear material, and by-product materials) substance or matter, but not including water vapor or steam condensate or any other emission exempted by the Air Quality Control Commission consistent with the Federal Clean Air Act. [*Colo. Rev. Stat. §25-7-105(1.5), (1992)*]

Air Pollution

Any concentration of one or more air pollutants in the ambient air that has caused, is causing, or if unabated, may cause injury to human, plant, or animal life, or injury to property, or which unreasonably interferes with the comfortable enjoyment of life or property or with the conduct of business.

Air Quality

The composition of air with respect to quantities of pollution as compared to the federal "National Ambient Air Quality Standard" of maximum acceptable pollutant concentrations before unhealthy conditions exist.

Ambient Air

That portion of the atmosphere, external to the source, to which the general public has access. [Colo. Rev. Stat. §25-7-105(5), (1992)]

Approved

Acceptable to the "authority having jurisdiction."

Arterial

2-lane or 4-lane public roadways that serve higher to moderate speeds and traffic volumes over moderate to long distances. Access to arterials is restricted with spacing standards between intersections and limited direct property access.

Authority Having Jurisdiction

The "authority having jurisdiction" shall be the Building Official. When matters of joint interest are involved, the Building Official may request referral comments from other organizations, offices, or individuals.

Average Daily Traffic (ADT)

The average daily volume of vehicles traveling on a given road.

Best Management Practices (BMPs)

A device, practice, or method for removing, reducing, retarding, or preventing targeted stormwater runoff constituents, pollutants, and contaminants from reaching receiving waters.

Building

Any structure used or intended for supporting human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof.

Building Official

The officer or other designated authority charged with the administration and enforcement of the International Building Code, or a duly authorized representative.

Clear Zones

Clear Zones are the distance necessary to meet the recovery zone slope requirements for safe recovery of a motor vehicle in the event it leaves the roadway.

CDOT

Colorado Department of Transportation

Development

Human-made improvement of property.

Drainageway crossing

Where an access or driveway crosses a natural drainageway.

Drainage Feature

Drainage channels, storm sewers, roadside swales, ponds, wetlands, grassed-lined swales, buffer strips and/or other elements used to either convey or receive storm water runoff.

Drainageway

A natural or artificial channel, swale, arroyo, gully, gulch, ditch, trench, creek, stream, river, slough, wetland, pond, reservoir, or lake that either conveys or receives seasonal or storm water runoff.

DRCOG

The Denver Regional Council of Governments (DRCOG), a nonprofit association of local governments dedicated to making the nine-county Denver region a great place to live, work and play.

Driveway

A vehicular access for private use that serves one lot or parcel connecting a house, garage, or other allowed use to the public or private access.

Dwelling Unit

Any building or structure, or portion thereof that contains living facilities with provisions for sleeping, eating, cooking, and sanitation for not more than one family.

Easement

The right of a person, government agency, or public utility company to use public or private land owned by another for a specific purpose.

Facility

A building in which is conducted the principal permitted use of the parcel on which it is situated.

Flag Lot

A polygonal-shaped lot, with the appearance of a flag and flagpole, that does not front or abut a public roadway and where the narrow "flagpole" part of the lot is used to provide access to the public roadway. Typically, the widest part of a flag lot is located at the rear of another lot or parcel, and the flagpole part of the lot is comprised entirely of a private access or driveway.

Hammerhead

A roadway that provides a "T" shaped three-point turnaround for emergency equipment, being no narrower than the road it serves.

Illicit discharge

Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges resulting from fire-fighting activities.

Impervious

Hard surfaces that do not allow water to infiltrate into the ground but instead increase the amount of surface runoff. Typically refers to roadways and parking lots. Also refers to rooftops, patios, and other hard surfaces.

Infrastructure

Roadways, transit facilities, water and wastewater treatment facilities, storm drainage facilities, and other utilities. May also include schools, police and fire stations, parks, and other civic facilities, either publicly or privately owned.

Major Drainageway Conveyance

A drainage flow path with a tributary area of 130 acres or more.

Natural Trail

A trail, whose surface is of natural components and not improved, widened, maintained or cleared of debris by the landowner or a public entity.

Non-point Sources

Runoff that is from diffuse sources (generally not carried in a pipe) and may contribute to water quality problems. Non-point sources include: stormwater runoff, mine water discharge, agricultural return flows, and water changed by diversions or impoundments.

Owner

A corporation, firm, partnership, association, organization and any other group acting as a unit, or a person who has legal title to any structure or premises with or without accompanying actual possession thereof, and shall include the duly authorized agent or attorney, a purchaser, devisee, fiduciary and any person having a vested or contingent interest in the premises in question.

Permit

An official document or certificate issued by the authority having jurisdiction which authorizes performance of a specified activity.

Person

An individual, heirs, executors, administrators or assigns, and also includes a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

Private Road

Any roadway, serving two or more residential lots, which will not be maintained by Arapahoe County.

Public Way or Public Roadway or Public Right-of-Way

A strip of land denoting public land, property, or interest therein, acquired for or devoted to public access or other public improvement involving maintenance by a public agency.

Public Works and Development Department

Herein referred to as PWD

Recovery Zone

The area adjacent to a roadway that is needed to recover a vehicle when it leaves the roadway. This area must meet certain slope requirements and be clear from any obstructions

Registered Colorado Professional Engineer

An engineer, registered or licensed to practice professional engineering, as defined by the statutory requirements of the professional registration laws of the State of Colorado.

Roads, Streets, Private Access

Land intended primarily for vehicular traffic and providing the principal means of access to property, including a roadway, access, drive, avenue, highway, boulevard, or any other thoroughfare other than a driveway as defined by this Appendix. Also, see Access.

Roadway

Any surface improved, designed, or ordinarily used for vehicular travel other than a driveway as defined in this Appendix.

Rural Areas

Lands within unincorporated Arapahoe County, which are located outside the boundaries of both the “Urban Services area” (as depicted in the Comprehensive Plan) and any “Urban Growth Boundary” for Bennett, Byers, Strasburg, or Watkins.

Rural town centers

Small, established communities located in the rural areas of the region, identified by DRCOG as having the potential to accommodate future population growth.

Slope

Upward or downward incline or slant, usually calculated as a percent of slope [rise or fall per one hundred (100) feet of horizontal distance].

Shoulder

Surface of the road adjacent to the traffic lane.

Street or Road Signage

Any sign containing words, numbers, directions, or symbols that provides information to emergency responders and the general public.

Structure

That which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

Technical Review Committee (TRC)

The committee established to review design and engineering issues and minimum requirements related to the standards used by the County and comprised of representatives of the Engineering Services Division and Transportation Division that have review responsibilities established by County rules and regulations.

Traffic Lane

That portion of a roadway that provides a single lane of vehicle travel in one direction.

Trail Tread or Tread

The travel surface of a trail.

Traveled Way

The portion of a roadway that provides for vehicular travel in all permitted directions.

Turnaround

A portion of an access or driveway unobstructed by parking, that allows for a safe reversal of direction for emergency equipment.

Turnout

A portion of a roadway that has been widened to allow vehicles to pass or park

Watershed

A geographical area that drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin)

Wetland

Areas characterized by growth of wetland vegetation (e.g., bulrush, cattails, rushes, sedges, willows, pickleweed, and iodine bush) where the soil is saturated during a portion of the growing season or the surface is flooded during some part of most years.