



CLEAR CREEK COUNTY ROADWAY DESIGN AND CONSTRUCTION MANUAL



Pine Valley Road, Clear Creek County

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Chapter 1 – Introduction and General Provisions

1.1 Short Title

These Regulations together with all future amendments shall be known as the Clear Creek County Roadway Design and Construction Manual (hereafter called Manual). This manual shall be the same document as referred to in the Clear Creek County Zoning Regulations and the Clear Creek County Subdivision Regulations as “The County Road and Driveway Design Standards”.

1.2 Purpose and Intent

This Manual is a comprehensive document containing design standards for: bridges, public roads, private roads and driveways. This document establishes a uniform policy for roadway development throughout Clear Creek County and provides a clear statement of the procedures for construction within the right-of-way. The purpose and intent of these policies and procedures are to provide safe attractive travel corridors, efficient traffic flow and efficient maintenance.

1.3 Enactment Authority

The State of Colorado, by statute, pursuant to 43-2-114 and 30-11-107 (1) (h), authorizes the Clear Creek County Board of County Commissioners (BOCC) to administer the County road system including, but not limited to, maintenance, layout, alterations, deletions, additions, property acquisition and traffic regulation. The Road and Bridge Department enforces road construction standards, reviews plans, conducts inspections, maintains and improves roads accepted by Clear Creek County, and administers work within the public right-of-way. Driveway standards are included and enacted by Resolution 24-82 which adopt these standards into the Clear Creek County International Code Series.

1.4 Types of Roads

The roads contained in the county wide circulation system can be classified based on the ownership of the road right-of-way and who has responsibility for maintenance.

1.4.1 County Owned and Maintained Roads:

Under this category, the county holds either a deed or an easement for the road right-of-way and has assumed responsibility for the road maintenance. These roads are listed in the annual inventory filed with the State of Colorado and the County receives an annual allotment of highway users’ fees to defray maintenance costs, based on the mileage of the roads listed.

1.4.2 County Owned Roads, but Maintained by Others:

In certain cases, private property owners using County owned roads for access desire a higher level of service than the County can provide. In such cases, the County and the property owners have reached an agreement assigning maintenance responsibilities to the property owners.

1.4.3 County Maintained Roads, but Owned by Others:

There are a few cases where the BOCC have allowed for maintenance to be performed on town streets and privately-owned roads for historic reasons.

1.4.4 Privately Owned and Maintained Roads:

This category includes all roads where the adjacent property owners retain ownership of the road right-of-way either through a deed, easements, or covenants, and they hold responsibility for its maintenance.

1.5 Road Numbering and Naming

All public and private roads, having three (3) or more residences, within the county have been assigned a name or County road number. The names or numbers are used for identification purposes to help speed emergency access by fire and ambulance and to assist in locating utilities by utility companies. Names or county numbers do not necessarily mean the roads are maintained by the County.

1.6 Application of Standards

All new road and bridge construction, whether the road or bridge is owned or maintained publicly or privately, and any upgrading of existing roads or bridges, whether public or private, commencing after adoption of these standards shall adhere to these Roadway Design and Construction Standards unless a deviation from the standards is granted by the BOCC.

1.7 Upgrading Existing County Roads

Many of the public roadways in Clear Creek County originated as mine access roads. Because these roads have no documented right-of-way or grants of easement, improvements are generally restricted to the existing traveled surface. A Road Construction Permit is required for any modifications or improvements made to these roads.

1.7.1 Definition of Development:

For the purposes of this Manual, with exception to Chapter 4, development shall be defined as: “Any construction or activity that changes the basic character or use of the land on which the construction or activity occurs and that is required, by County Regulation, to apply as a subdivision, official development plan or development review”.

1.7.2 Upgrading Needed to Accommodate New Development:

Where new development is proposed along existing County roads, the developer’s proposal shall include an analysis of the projected traffic volumes, along with information on existing road: right-of-way, widths, curves, intersections and surface drainage. This information shall be used to determine what improvements are necessary, on existing County roads, to accommodate the additional traffic to be generated by the new development. These standards establish maximum traffic volumes for certain classifications of roadways as stated in Table 1. If a proposed development will cause these maximum limits to be exceeded on the adjacent roads providing access between the development and State highway system, the developer shall be responsible for the cost of improving the affected roads to a classification where the maximum is not exceeded. In calculating whether the maximum limits will be exceeded, the cumulative traffic volumes based on surrounding land uses and approved zoning and not just counts of existing traffic levels shall be used.

1.7.3 Upgrading Requested by Property Owners:

In many instances, roads in older subdivisions and the rural areas of Clear Creek County are substandard because they were built as mining roads or before the County had an adequate system for enforcing road design and construction standards. Most of these roads are too steep or narrow for the County to maintain adequately if at all. Upgrading existing roads to correct these problems shall be at the expense of the property owners served by such roads. Upon request of the property owners, the County may assist in the formation of a local improvement district. Completion of the improvements does not in itself constitute acceptance for maintenance.

1.8 Construction of New Roads

These standards will be used for any new construction in Clear Creek County.

1.8.1 New Roads to be Built by Developers:

Where new roads are proposed to be built by a developer which serve more than five (5) residences the developer's proposal shall include an analysis of the projected traffic volumes; information on: topography, surface drainage, and extent of cuts and fills, along with construction plans and specifications. The road design and construction specifications shall be reviewed and approved by the Clear Creek County Road and Bridge Supervisor in conjunction with the final plat, or if no plat is required, prior to the commencement of construction. If it is deemed necessary or appropriate to refer the road design and construction specifications to an outside consultant, by the Road and Bridge Supervisor and/or BOCC, the cost for the review shall be borne by the developer. The total cost of roads required to serve new development shall also be borne by the developer.

1.8.2 New Roads to be Built by the County:

Plans and specifications for roads to be built by the County shall adhere to the road design and construction standards contained in this Manual and shall be reviewed and approved by the Clear Creek County Road and Bridge Supervisor prior to the commencement of construction.

1.8.3 New Roads to be Built as Private Roadways for Five or Fewer Homes:

For road construction and rehabilitation for the use as private access to five (5) or fewer single-family residences the developer's proposal shall include information on: dimension, grades, surface drainage and cut and fill slope gradients. The road design and construction specifications for roads in this category shall be reviewed and approved by the Clear Creek County Site Development Department in accordance with Chapter 4 of this Manual. The Site Development Department will administer permitting, specifying pertinent standards, and review plans for private roads.

1.9 Permits for Road and Bridge Construction

Prior to the commencement of construction of any new road or bridge, the project proponent must obtain approval for a Road Construction Permit from the Site Development Department in accordance with Chapter 3 of these regulations. Prior to construction of any improvements to an existing road or bridge, the project proponent must obtain approval for a Road Construction Permit or a Right-of-Way permit in accordance with Section 3.3.1, 4.7.2 and/or 5.3 of these regulations. Conformance to other County regulations may also apply, such as: Best Management Practices Manual, Flood Damage

Prevention Regulations, Grading and Excavation Regulations, and building code requirements for structures.

1.10 Road Vacations

Any party wishing to initiate a road or access easement vacation must apply to the County Planning Department. The application must include a complete and accurate legal description, signatures of any adjacent landowners affected by the vacation, and signoffs from utility providers. Notice to all interested parties shall be mailed, and the BOCC shall consider the request at an announced time and place. (Refer to C.R.S. 43-2-300, as amended.)

Chapter 2 – Road and Bridge Design Criteria

2.1 Purpose and Intent

This section sets forth specific standards for roadway and bridge design in Clear Creek County and is intended for use by design engineers.

2.2 Adopted Policy and Design Reference Manuals

Clear Creek County has recognized and adopted the following publications as policy guides and design criteria references:

- 1) A Policy on Geometric Design of Highways and Streets, 7th ed., Washington D.C., American Association of State Highway and Transportation Officials (AASHTO), 2018
- 2) Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT≤400), Washington D.C., American Association of State Highway and Transportation Officials (AASHTO), 2001
- 3) Manual of Uniform Traffic Control Devices, (MUTCD), 11th Edition, Washington D.C., U.S. Department of Transportation Federal Highways Administration, 2024
- 4) Urban Storm Drainage Criteria Manual, Colorado, Urban Drainage and Flood Control District, January 2016
- 5) Traffic Engineering Handbook, 7th ed., Washington D.C., Institute of Transportation Engineers, 2015
- 6) Transportation Planning Handbook, 4th ed., Washington D.C., Institute of Transportation Engineers, 2016
- 7) Traffic Control Devices Handbook, 2nd ed., Washington D.C., Institute of Transportation Engineers, 2009
- 8) Guide for Development of Bicycle Facilities, 4th ed., Washington D.C., American Association of State Highway and Transportation Officials (AASHTO), 2012
- 9) CDOT Design and Construction Specifications and Procedures
- 10) Fifield, Jerald S. Ph.D, Designing for Effective Sediment and Erosion Control on Construction Sites, California: Forester Press, 2001

2.3 Road Classifications

County roads are classified according to function. Functional classifications shall be recommended by the Clear Creek County Road and Bridge Supervisor, and adopted by the BOCC who has the authority to determine which classification applies to any given road. Criteria used to design roadways are based on their functional classification for planning purposes. Clear Creek County uses the following functional categories in classifying its roads:

2.3.1 Principal Arterials:

A principle arterial is a continuous access-controlled road, which serves corridor movements having trip length and travel density characteristics indicative of statewide travel. All principle arterials in Clear Creek County are administered by the Colorado Department of Transportation.

2.3.2 Arterials:

Arterials link cities, larger towns and other traffic generators such as major subdivisions. They provide a means of intra-county travel. Arterials should provide for relatively high overall speeds with minimum interference to through movements. This classification is consistent with the County's sub-classification of "Primary County Maintained Roads", which is described as follows:

Roads and connections carrying heavy traffic flow into and out of subdivisions and residential or commercial centers (including municipalities) in various sectors of the County. Primary roads can have either asphalt surface and/or gravel surface, and are graded and drained. Roads in this category may carry school bus traffic and mail routes, and receive first day snow removal service by the Road and Bridge Department.

2.3.3 Collectors:

Collectors provide a link between local roads and arterials, and allow for the movement of through traffic in neighborhoods. Collectors should be designed so they do not disrupt the activities and land uses they serve. In addition, access to collectors should be designed so it minimized

2.3.4 Local Access Roads:

Local access roads provide direct access to and connections between individual residences, businesses community facilities and other land uses within neighborhoods. They also link individual properties to the collector and arterial roadway network. This type of road is for the use by property owners, the general public and service vehicles such as trash trucks, delivery trucks and snowplows. Roads serving neighborhoods that have been or proposed to be subdivided into lots of less than 20 acres in size must meet, at minimum, local access standards. Where a subdivision includes lots of differing sizes such that some are less than 20 acres and some are more than 20 acres, roads serving such subdivisions shall meet the more stringent standard. Roads serving neighborhoods where lot sizes are at least 20 acres but less than 35 acres, and projected traffic volumes for these roads exceed 500 trips per day shall also meet local access standards. This classification is consistent with the County's sub-classification of "Secondary County Maintained Roads" and is described as follows:

Roads that may not meet vertical or horizontal alignment standards, and may not allow for the safe passage of two vehicles. Roads with this classification which are maintained on a year-round basis may expect snow removal on the second or third day, and may not receive snow removal with each snowfall; existing conditions may curtail secondary service in order to focus operation on Primary Roads. Some roads in this classification may have a seasonal maintenance classification with no winter maintenance.

2.3.5 Low Volume Roads:

Low volume roads provide direct access to individual properties within the remote areas of the County. Low volume roads provide connection from these remote areas to local access and collector roads. When an area in the county is proposed to be subdivided into lots of less than 35 acres, the Clear Creek County Road and Bridge Supervisor shall consider potential future uses of the property and of adjacent properties in projecting traffic volumes, and may require a higher standard for road design if necessary to accommodate future traffic volumes and to implement a coordinated, functional road system. This classification is consistent with the County's sub-classification of "Secondary County Maintained Roads"

and “Secondary County Non-Maintained Roads”. Secondary County Non-Maintained Roads are described as follows:

Roads that have a wide variety of road surfaces and provide ingress/egress for the traveling public. This classification includes roads which are on the County Highway System but not maintained. Most of these roads are traversable by four-wheel drive vehicles only. While these roads receive no snow removal, they may be periodically maintained or repaired by the Road and Bridge Department.

2.3.6 Primitive Roads:

A primitive road is a single or two-lane road providing direct access to undeveloped areas, remote mine sites, recreational and scenic areas. This type of road shall not be used to provide access to subdivided property. This classification is consistent with the County’s sub-classification of “Secondary County Non-Maintained Roads”.

2.4 Road Design

All road design plans, and specifications shall be prepared by a Colorado licensed Professional Engineer.

2.4.1 Future Planning:

Prior to the design of a new or an upgrade for an existing road, projections of future development and densities, estimates of future traffic volumes, appropriate classifications and design speeds must be determined. The road classification determines the geometric cross section and maximum sustained grades while the design speed determines minimum or maximum standards for elements of alignment such as stopping and passing sight distances, radii of curvature, tangent lengths and super elevation transition lengths. Standard structural sections or designed structural sections may be used.

- A. Design Period:** Roadway design will be based on the projected needs twenty (20) years after construction.
- B. Projected Development:** Projections of development over the design period will be based on the County master plan in effect and on zoning, existing land use, proximity to developed areas, historic growth and other factors which can be expected to influence development.
- C. Projected Traffic Volumes:** Table 2 presents traffic generated for various types of development. For example, residential property generates an average daily traffic (ADT) count of ten trips per living unit. These per unit ADT counts are applied to the projected development to generate estimates of the design year traffic volumes. When per unit ADT counts are not listed for a type of development or an ADT has not been established for a particular category or location by the Road and Bridge Department, the design engineer shall use the ITE Transportation Planning Handbook to obtain the appropriate ADT count.

2.4.2 General Design Elements:

- A. Design Capacities:** Table 1 presents the range of ADT’s anticipated for each type of road. If traffic volumes on a particular road exceed the range specified for its functional category, the road shall be reclassified to the appropriate category. However, roads may carry lower volumes than stated for their functional category without being reclassified. In such cases, the function of the road rather than traffic volumes will determine design requirements.

- B. Design Speed:** The selection of design speed is influenced principally by: the character of terrain, traffic volumes and appropriate range of design speeds for each road classification. Design speed shall be a minimum of five (5) MPH over the posted or proposed speed limit.
- C. Surfacing Requirement:** All roads serving areas with projected densities of two units per acre or greater, or expected to carry a traffic volume of 700 ADT or greater must be paved. Other roads may have a gravel or paved surface.
- D. Right-of-Way:** The minimum right-of-way widths required for each road classification are specified in Table 3. Additional right-of-way shall be provided for drainage improvements, cuts or fills, intersections, curb returns, snow storage and other road appurtenances.
- E. One-Way Roads:** One-way roads will not be allowed for the following reasons:
 1. Property owners at the far end of a one-way loop road tend to take short cuts and drive the wrong way to reach their properties, thus increasing the chances for accidents.
 2. Emergency vehicles must in certain cases take a more circuitous route to reach their destination.
 3. One-way roads can cause confusion for people not familiar with the area.
 4. In winter, snowplowing often reduces the driving surfaces of roads because snow accumulates along the edges. On one-way roads, this reduction may pose a serious safety problem because it hampers access for emergency vehicles, and limits the area available for their operation.
- F. Striping:** All paved roads may be striped with appropriate centerline and shoulder stripes per the MUTCD or CDOT Standard S-627-1. This shall apply to collector and higher functional classification roads or as determined necessary by the Road and Bridge Supervisor.

2.4.3 Specific Design Elements:

A. Alignment:

The major considerations in alignment design are: safety, grade, profile, road width, design speed, sight distance, topography, drainage and the maneuverability, braking and performance of heavy-duty vehicles. Alignment should provide for safe and continuous operation at a uniform design speed. In mountainous areas, consideration should be given to locating the road so that a southern exposure will be obtained wherever possible. Road layout should bear a logical relationship with existing or platted roads in adjacent properties and to the principles of good engineering practice. All roads shall be designed such that the roads are centered in the right-of-way.

1. Horizontal Alignment:

- a. Stopping Sight Distance:** Horizontal alignment must provide at least the minimum stopping sight distance for the design speed at all points. This includes visibility at intersections as well as around curves and roadside encroachments. The minimum stopping sight distance is the distance required by the driver of a vehicle traveling at the design speed to bring the vehicle to a stop after an object on the road becomes visible, using the AASHTO recommended deceleration rate of 11.2 ft/sec^2 . Stopping sight distance is calculated in accordance with the following formula, or Table 4, whichever is greater:

Stopping Sight Distance

$$1.47ut + \left(\frac{u^2}{30(f \pm G)} \right) = SSD$$

Where:

u = speed in MPH

t = reaction time (2.5 seconds)

G = grade, in percent

f = coefficient of sliding friction

With f equaling the following factors based on design speed of roadway:

<u>Design Speed</u> MPH	<u>f</u> (Design Criteria: Snow-Packed)
20-40	.24
40-50	.22
50-60	.21
60-70	.20

Where an object off the pavement restricts sight distance, the minimum radius of curvature is determined by the stopping sight distance, but in no case will it be less than as specified in Table 5.

Offset clearance to achieve stopping sight distance on horizontal curves can be obtained from Table 4. The centerline of the inside lane is used, with offset distance measured from the centerline of the inside lane to the obstruction.

- b. Passing Sight Distance:** Passing sight distance is the minimum sight distance that must be available to enable the driver of one vehicle to pass another safely and comfortably without interfering with oncoming traffic traveling at the design speed. Two-lane roads should provide adequate passing zones. Required passing sight distances for given design speeds are stated in Table 4.
- c. Curvature:** Table 5 specifies the minimum centerline radius of curvature for specific design speeds. This table is based on speed alone and does not take into consideration sight distance factors. Every effort should be made to exceed the minimum values.

Consistency in design speed and curve radii should be used to avoid surprising driver. Where changes in the design speed are necessary, the design speed between approach tangents and curves will not change by more than ten (10) MPH. Under no condition will a low speed curve be introduced at the end of a long tangent where high approach speeds are anticipated. Compound curves should be avoided. Reversing curves without an intervening tangent will not be permitted where design speeds exceed twenty-five (25) MPH. The minimum lengths of such tangents are specified in Table 5. Broken-back curves are not allowed.

- d. Curb Returns:** Curb returns or pavement rounding radii at intersection corners are as follows:

Road Class	Curb Return Radius
Local	30 feet
Collector	30 feet
Arterial	35 feet

Additional right-of-way will be required to provide a minimum clear distance for fifteen (15) feet between the curb or edge of pavement and the right-of-way limit.

- e. Intersections:** The minimum distance between intersections for various road classifications is as follows:

Road Class	Distance
Local	200 feet
Collector	500 feet
Arterial	1,000 feet

Distance is measured from the inside edge of each right-of-way.

2. Vertical Alignment:

- a. Minimum and Maximum Grades:** Minimum and maximum sustained grades shall be 1% and 8%, respectively, except as provided in **b.** below. Grades on stop-controlled roads at an intersection will flatten to 4% or less for at least 50 feet approaching intersections on **local access** roads. Grades on stop sign controlled roads at an intersection will flatten to 3% or less for at least 100 feet approaching intersections on **collector** roads. Grades approaching the turnarounds in cul-de-sacs will be 4% or less for at least 50 feet.
- b. Exceptions to Maximum Grade:** A local access or low volume road may have sections with a grade of 10% provided that the dip of natural terrain bears between South 60° East and South 45° West.
- c. Vertical Curves:** Vertical curves must be designed to provide adequate stopping and passing sight distance, headlight distance, driver comfort and good drainage.

Minimum lengths of crest vertical curves are controlled by stopping sight distance requirements. The minimum length for sag and crest vertical curves will be determined by Table 4.

Vertical curves that are long and flat may develop poor drainage and should therefore be avoided. Vertical curves are not required where the algebraic difference in grade is less than 0.2%.

- d. Sight Distance:** The grade line must meet sight distance requirements for the design speed. Table 4 provides the minimum passing sight distance for the crest of vertical curves.

3. **Switchbacks:** A switchback is defined as a curve with a delta greater than 120 degrees and a radius less than 100 feet.
 - a. **Use of Switchbacks:** Switchbacks will not be allowed on collector or arterial roadways. On local access, low volume, or primitive roadways when other alternatives may cause significant adverse impacts, the use of switchbacks may be allowed on a case-by-case basis, with approval from the County Road and Bridge Supervisor and/or the BOCC.
 - b. **Minimum Standards:** Switchbacks shall be designed with a minimum centerline radius of 60 feet. Maximum centerline grades within 25 feet of a switchback curve and throughout the curve shall not exceed 4%. Curve widening shall be in accordance with Section 2.4.3.B.7 Adequate snow storage must be provided.
4. **Alignment Coordination:** When vertical and horizontal curves are superimposed, the super-elevation may cause distortion in the outer pavement edges. Where this may be the case, edge of pavement profiles shall be plotted and smooth curves introduced to remove any irregularities. Sharp horizontal curves should not be introduced at or near a pronounced crest or sag.

B. Geometric Cross Sections:

1. **Typical Sections:** A typical section for each road classification is shown in Figures 1 through 6.
2. **Travel Lane Width:** The minimum travel lane width for arterial and collectors is 12 feet, for local access road is 11 feet, and low volume roads is 10 feet.
3. **Crown Slope:** On undivided roads in tangent alignment, the high point of the crown will be centered on the pavement and the pavement sloped toward the edges on a uniform grade. In mountainous terrain, roads will be sloped toward the cut side of the road on a 3% slope to alleviate surface erosions. On divided multilane roads on tangent alignment, each travel way will have a uniform cross-slope with the high point at the edge nearest the median. The crown slope shall not exceed the percentages shown in Table 6.
4. **Super-elevation:** To account for snow and ice conditions, which occur frequently in Clear Creek County, the maximum super-elevation will be limited to 0.08 feet per foot, (see Table 7). The axis of rotation of undivided roadways is usually the centerline. For curves following long, level tangents, the axis of rotation shall be taken at the inside edge of the pavement. The divided roads with wide medians, the axis of rotation shall be the inside edge of pavement. For divided roadways with narrow medians, each roadway shall be rotated about the edge adjoining the median strip.
5. **Super-elevation Transition:** Super-elevation transition is the progression of the roadway from the normal crown section to a fully super-elevated section. To meet the requirements of safety and comfort, the length required to affect the transition should be adequate for the likely travel speeds. Suggested minimum lengths are given in Table 7. It is recommended that 60 to 80 percent of the super-elevation runoff be on the tangent.
6. **Spiral Curves:** Where the alignment includes spiral curves, super-elevation is applied entirely on the easement curve.
7. **Curve Widening:** Curves will be widened on the inside radius to allow for vehicular off-tracking in accordance with the following formula:

$$W = 1.5 \frac{u^2}{R}$$

Where:

W = additional radial width of pavement

u = speed in MPH

R = Curve radius (Refer to Table 5)

- 8. Cul-De-Sac Streets; Turnarounds:** Whenever possible roadway systems shall provide at least two access points to lots platted for development. Using cul-de-sac streets shall be avoided. Where cul-de-sac streets are the only alternative, turnarounds shall be provided. Bulb type turnarounds shall have a minimum road surface of 64 feet in diameter and a minimum right-of-way 90 feet in diameter. An alternative to the bulb type turnaround is the use of a hammerhead turnaround. Figure 7 illustrates three acceptable hammerhead configurations.

Roads ending in turnarounds greater than 600 feet in length shall provide wildfire mitigation such as: fire cistern storage, fuel breaks, and tree thinning as determined by the Clear Creek Fire Authority or the Evergreen Fire Protection District. Snow storage shall be provided as shown in Figure 7 to keep turnarounds cleared. Dead end roads that do not have turnarounds are not allowed.

C. Structural Sections:

- 1. Design Structural Sections:** Structural sections shall be designed for all new roads, driveways, or road being upgraded due to increased traffic. The road structure will be in accordance with the following equation:

$$T = 0.0384(TI)(100 - R)$$

or

$$1.811(TI)(2.12 - \log CBR)$$

Where:

T = Thickness in inches

TI = Traffic index

R = Resistance (stabilimeter test)

CBR = California Bearing Ratio

- a. Traffic Index:** The effect of traffic and weather on a roadway over its design life is expressed by the traffic index (TI). Table 8 shows the minimum traffic index values for different road classifications. These minimums may be proposed to be increased by the County Road and Bridge Supervisor and approved by the BOCC if existing or future traffic warrants.
- b. Minimum Structural Requirements:** The minimum structural sections outlined in Table 9 shall be adhered to on all roads in Clear Creek County. These minimum structural sections are based upon a minimum sub-grade “R” value of 60 or a CBR of 17. For “R” values less than 60 or CBR less than 17, an engineered section must be designed. The proponent shall submit “R” value tests performed by an approved geotechnical engineer prior to approval of the final

road design. All Asphalt shall be placed in multiple lifts with each lift being 1.5" minimum or 3" maximum.

- c. **Concrete Paving:** Areas where a considerable amount of stopping or starting occurs, such as bus stops or signalized intersections, shall be paved with a designed concrete section to minimize the effects of dynamic loading on the pavement.

D. Drainage:

- 1. **General:** The primary objective of drainage design is protection of County roads and property while minimizing the possible flood damage to surrounding properties and structures. It should be emphasized that good drainage is one of the most important factors in road design. It preserves the appearance as well as the level of service of the road while minimizing maintenance costs.

Water flowing in a roadside ditch shall be diverted away from the road as quickly as possible. In no case shall water travel in a roadside ditch for a distance greater than 800 feet or have a flow greater than five (5) cubic feet per second with the occurrence of a 25-year frequency storm.

Culverts under all roads shall be designed to accommodate a 25-year frequency storm run-off utilizing the maximum available head. The maximum available head shall be determined by the uppermost ponding elevation chosen to prevent flood damage to upstream properties.

Inlets and other facilities draining the road surface shall accommodate the 25-year frequency storm runoff. All roads shall remain free of ponding.

All drainage installations shall be designed to permit free, unobstructed passage of debris and silt or provide for their deflection and/or collection at a point upstream that will not create an expensive maintenance problem. Settlement basins shall be provided when a silting problem may exist downstream.

Modification of natural channels or transferring runoff from one basin to another is not permitted except where no reasonable alternative exists and where the proposal has been reviewed and approval by the County Road and Bridge Supervisor and/or the BOCC.

A recurring problem on Clear Creek County roads is ice buildup in winters of little snow. Drainage design shall anticipate areas of potential ice buildup.

French drains that accommodate any off right-of-way drainage problem shall be designed to provide a minimum of 50 feet of overland sheet flow before reaching any roadside ditch.

- 2. **Storm Runoff Estimates:** The following methods may be used for estimating peak flows:
 - a. Runoff from stream flow records.
 - b. Tabular Method as per Technical Release M55 from the Engineering Division of the USDA.
 - c. HEC-2 Computer Program from the Corps of Engineers.

- d. Technical Manual Model for Estimating Flood Characteristics from the Colorado Water Conservation Board.
- e. The Rational Method, as follows:

$$Q = CiA$$

Where:

Q = runoff in cubic feet/second

C = Coefficient of runoff (See Table 10)

i = average intensity of rainfall in inch/hour for a duration of the time of concentration.

A = drainage area in acres.

The Rational method should only be used on areas of less than on hundred and sixty (160) acres.

- 3. **Culverts:** Culverts shall be located at each natural draw or water course as conditions warrant to prevent excessive accumulation of flow in roadside ditches or along the toe of slopes. Draws and water courses shall be cleared of debris for a distance of 100 feet upstream from all culvert inlets.

Inverts at the inlet shall be slightly elevated above the normal flow line in steep or natural draws to avoid plugging by debris. Inlets shall not be elevated in those instances where ponding or accumulation of backwater curves would be objectionable (stagnation, irrigation ditches, etc.).

The culvert shall slope downward in the direction of natural flow and be designed to be self-cleaning whenever possible. The outlet shall be designed not to discharge on unprotected fills or unstable material or at adverse angles to streams or open channels. Headwall, rip-rap or other means of protection are required at inlets or outlets where erosion might occur.

Velocities of flow in culverts shall be calculated using acceptable design charts and formulas. Where the Manning-Equation is used, the following “n” values will apply:

Material	Manning Equation “n” Values
Corrugated Steel Pipe	.027
Reinforced Concrete Pipe	.013
Concrete	.013 to .020
Asphalt	.016
Corrugated Polymer	.024

Corrugated metal pipe, reinforced concrete pipe, high density polyethylene pipe or an approved equal as specified by the Road and Bridge Supervisor shall be used. Steel pipe shall be asphalt coated where soils are corrosive or other conditions exist that may attack steel. Aluminum or other pipe materials are not permissible for road culverts.

Minimum diameter for round pipe shall be 18 inches. The minimum rise of arch pipes shall be 12 inches.

Clean out access shall be provided at least every 200 feet for pipes 24 inches in diameter or less and at least every 400 feet for large pipes. Clean out access shall be also be provided at each angle point and at each change in grade.

- 4. Open Channels and Ditches:** Channels and ditches shall be designed to avoid roadside safety hazards. The minimum flow line slope shall be 1.0%. Maximum slopes shall be controlled by the maximum permissible velocities given in Table 11.

Manning's equation shall be used to estimate velocities.

$$v = \frac{1.486R^{2/3}S^{1/2}}{n}$$

Where:

v = Velocity of flow in channel in feet per second

n = roughness coefficient (Table 11)

R = Hydraulic radius in feet

S = slope in feet per foot

Where the materials channel is comprised of a combination of the materials given in Table 10, the maximum permissible velocity elected should prevent undue scouring of the finer materials silting downstream.

- 5. Subsurface Drainage:** Sub-grades subject to poor drainage, underground seepage or a high-water table shall be adequately drained for roadbed stabilization. Drains shall be installed to prevent high ground water level from coming within four feet of the roadway pavement. Perforated pipe shall be used to carry away collected water. French drains which contain no pipe and are not wrapped with geotextile fabric are unacceptable.
- 6. Inlet Structures:** Curb openings with protection bars are preferred. Other designs will be permitted on approval by the County Road and Bridge Supervisor. Grates are not permitted where pedestrians, bicycles or debris-laden flows are anticipated.

E. Side Slopes:

Any slope designed steeper than 1½:1 (H:V) shall be certified for stability by a Colorado licensed Professional Engineer qualified in soils analysis. Where heavy snowfall is expected, flatter slopes in cuts on the southern side of the roadway should be used to provide maximum exposure to the sun. Flatter slopes should be used wherever possible to reduce erosion, to decrease maintenance costs, to facilitate plant growth and to provide for safer operation. Transition slopes shall be provided between adjoining cuts and fills and shall be designed for pleasing appearance. Where cut or fill slopes intersect the original ground surface, the cross section shall be rounded to blend the slope into the natural ground surface.

Where the slopes of the original ground approach 1½:1, the embankment shall be contained with a suitable retaining wall to avoid long fill slopes. Side slopes in rock will be based on the

stability of the formation. Retaining walls on the uphill side shall be a minimum of five (5) feet from the centerline of the adjacent drainage ditch. Benching of side slopes should be used sparingly and only where they are justified by sound engineering reasons, including the following:

1. To stabilize material where benching is more economical than flattening.
2. To intercept drainage in long and deep cuts.
3. To intercept and store loose material.

Side slopes that are steeper than 1½:1 (H:V) shall be contained with a suitable retaining wall designed by a Colorado licensed Professional Engineer. Side slopes in rock may be as steep as ½:1 (H:V) in competent formations when determined stable by a Colorado licensed Professional Engineer qualified in soil analysis.

F. Sidewalks:

Sidewalks shall be required where, in the opinion of the Road and Bridge Supervisor and/or the BOCC, the number of pedestrians is sufficient to interfere with traffic or significant pedestrian usage is anticipated. Where sidewalks are installed, the individual property owners shall be responsible for clearing snow and ice from sidewalks in front of their property.

2.4.4 Payment of Costs for New Road Construction

A. Developer Responsibility:

Any and all costs of new road construction in new developments are the responsibility of the developer. The developer is also responsible for constructing the new roads, whether public or private, according to the Manual.

B. Payback Agreements:

During the approval process for a proposed development, the developer may be required to construct a new road or to make improvements to an existing road which also benefits future developments. The BOCC may establish a plan of compensation to the original developer whereby subsequent beneficiaries pay a fair share for the use of those improvements. Such a plan would be administered by the County and make a condition of approval for future benefitting developments. The BOCC shall determine the equitable distribution of benefits and costs.

2.5 Upgrading Existing Roads

2.5.1 Design Standards:

Any and all County roads, whether public or private, requiring upgrading or improvement shall be built in accordance with the Clear Creek County Roadway Design and Construction Manual.

A. Serving New Developments:

1. **Requirement for upgrading:** Existing County roads serving new development or an area proposed for either platting or replatting must be upgraded according to the Manual when one or more of the following conditions occur:

- a. Existing roads do not meet the Road Standards for the classification.
 - b. Existing roads meet local access standards but the projected ADT will exceed the cut off limit for paving.
 - c. Existing roads meet local access standards but the projected ADT exceeds the maximum for local access, thus requiring improvement to collector or arterial status.
2. **Payment of Costs:** The developer shall be responsible for all costs incurred to upgrade existing County roads.
 3. **Payback of Costs:** Benefiting property owners along existing roads which must be upgraded shall pay back a fair share of the road improvement cost if, in the judgement of the BOCC, a pay back to the developer is appropriate.

2.6 Bridge Design

2.6.1 Design Standards for Bridges:

Bridges located on public lands shall be designed in accordance with American Association State Highway & Transportation Officials (AASHTO) or Colorado Department of Transportation (CDOT) requirements. Bridges on private lands may be designed according to applicable AASHTO, CDOT or International Building Code requirements and must accommodate loading and width requirements of emergency service providers.

Plans shall be signed and sealed by a licensed Colorado Professional Engineer qualified in structural bridge design and shall be submitted to the Site Development Department for review and approval prior to construction. Calculations with an independent design check and load rating shall be submitted on all bridges located in the public right-of-way. Clear deck width must accommodate the full width of the travel lanes and shoulders of approach roads.

The waterway area shall accommodate a 100-year flood event. Where flood studies from the U.S. Army Corp of Engineers or the Federal Emergency Management Agency are available, bridges shall be designed in accordance with approved risk analysis policies. A minimum of one-foot freeboard is required. Additional freeboard shall be required when debris laden flows are anticipated.

2.6.2 Payment of Bridge Construction Costs:

If the design of the roadway serving a new development requires construction of new bridges or upgrading existing bridges, the developer shall be required to pay the cost of such construction. Where construction of a bridge benefits future developments the BOCC may establish a plan of compensation to the original developer whereby other beneficiaries pay a fair share for use of the bridge.

2.7 Traffic Safety

2.7.1 Guardrails:

Guardrails are installed to prevent accidents by delineating the roadbed, to reduce accident severity by deflecting vehicles into safer paths and to reduce the rate of acceleration in case of impending collisions with fixed objects.

A. Design and Placement on Roadways:

Only state approved guardrail shall be used. The length of guardrail should be planned in multiples of 12.5 feet. No abrupt or projecting ends shall face toward approaching traffic and delineators shall be installed according to the Manual of Uniform Traffic Control Devices (MUTCD) or CDOT's Procedure and Standards. Ordinarily, guardrail is placed only on the outside of curves.

1. When guardrail is used in conjunction with roadside curbs, the face of the guardrail shall be flush with the face of the curb regardless of shoulder width. This is to prevent the takeoff ramp effect which may overturn a vehicle. When no curb is present, the face of the guardrail shall be flush with the edge of the shoulder.
2. On curves requiring a reduction in approach speeds, any one of the following conditions suggests installation of guardrail on the outside of the curves needed:
 - a. height of embankment is more than ten feet
 - b. side slopes are steeper than 4:1
 - c. shoulder or pavement widths are substandard
 - d. roadside hazards are present
3. Whether on curves or tangents, consideration should be given to the installation of guardrails if there is a history of roadway accidents or if unusually high embankments or steep terrain give motorists a feeling of insecurity.
4. In areas subject to dense fog or snow and ice conditions, or where traffic speed and volumes are high, guardrail may be needed where its installation would otherwise be questionable under less adverse conditions.
5. Other conditions requiring guardrails: Guardrails may be required under the following circumstances:
 - a. an obstruction or sudden constriction in roadway
 - b. an on a roadway otherwise built to height standards.
 - c. approaches to bridge piers, abutments, trees or other obstructions.

B. Guardrail at Bridge Approaches:

Guardrail should be placed at the ends of all bridges on the right of approaching traffic. Where pedestrians are expected to use the shoulder, a walkway should be provided around the end of the guardrail outside the normal shoulder lines.

C. Provisions for Snow Storage:

When guardrails are considered for installation, especially for extended lengths, provisions shall be made for adequate snow storage and removal.

2.7.2 Traffic Control Devices:

All signs, striping, markers, delineators, signals and other traffic control devices must conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) published by the U.S. Department of Transportation Federal Highway Administration. In new developments, all required; street name signs, speed limit signs, stop signs and other traffic control devices shall be installed and paid for by the developer. Nonstandard and/or unnecessary signs or other traffic control devices are subject to rigid State control, and approval by the Road and Bridge Supervisor and/or the BOCC shall be

obtained for their use. Requests for nonstandard signs or other devices shall be submitted to the Road and Bridge Department along with all data required to support the request.

2.7.3 Sight Distance Triangle:

A. Determining Dimensions and Location of Sight Distance Triangles:

For safety and visibility purposes, a sight distance triangle shall be maintained at street intersections and where driveways intersect a street. The distances along the legs of the sight distance triangle shall be measured from the corner of intersection point along the right-of-way lines or along the edge of the driving surface for driveways as shown in Figure 8. Where a road right-of-way is wider than normal or varies in width because it has been expanded to include cut and fill slopes or drainage improvements, the line along which the legs of the sight distance triangle are measured shall be parallel to the roadway at normal right-of-way width for the type of road under consideration (see figure 9). For each intersection, the length of the legs of the triangle shall be determined by the classification of the roadways which form the intersections as follows:

Driveways	10'
Low Volume	30'
Local Access	30'
Collector	50'
Arterial	70'

Examples of several typical combinations are provided in Figure 10. The area enclosed by the three sides of the triangle shall form an imaginary plane. The angle of the edge of this plane which lies along a right-of-way line shall be equal to the height of the corresponding point along the curb, or if there is no curb, to the elevation of the corresponding point along the centerline of the road. No landscape materials, earth berming, sign, structures, or other visual obstructions shall be allowed between three and one half (3.5) feet and seven (7) vertical feet above the surface of this plane. This regulation is not intended to prohibit the planting of trees or retention of existing trees in the sight distance triangle, if they are pruned so branches are higher than seven (7) feet. Installation of traffic control signs or signals and street lights are exempt from this regulation.

B. Incorporation requirements for Sight Distance Triangles into Subdivision Design:

Developers shall incorporate the requirement for maintenance of a sight distance triangle at street intersections and intersections of driveways with streets in the design of subdivisions submitted for County review after the effective date of this regulation. Particular attention shall be given to the size and shape of corner lots.

C. Enforcing Requirements When Building Permits are Issued:

1. No building permit shall be issued for a structure that interferes with maintenance of a sight distance triangle unless application of the requirement would result in peculiar and exceptional practical difficulties to, or exceptional and undue hardship upon, the individual proposing development of the property. The County Road and Bridge

Supervisor and/or the BOCC shall have authority to waive the requirement for maintenance of a sight distance triangle for such property.

2. Where a building permit application is filed for property that was platted or re-platted after the effective date of this regulation, no building permit shall be issued for any structure which would interfere with the maintenance of a sight distance triangle required by this regulation.

D. Continuing Enforcement of Requirements:

Property owners shall be responsible for maintaining sight triangles free of visual obstructions for that portion of a triangle which falls within the boundaries of their property. When the County Road and Bridge Department receives a complaint concerning visual obstructions at a particular intersection, the Road and Bridge Department shall be responsible for the inspection of the intersection and for taking the following measures:

1. Determining whether the visual obstruction is within the sight triangle for an intersection, and if it is on public or private property.
2. If the visual obstruction is on public property, requesting the appropriate jurisdiction remove the obstruction; if the jurisdiction is the County, remove the obstruction.
3. If the visual obstruction is on private property, notifying the property owner of the requirement that visual obstructions must be removed within 30 days except as follows:
 - a. If the obstruction is a permanent structure which was built prior to the effective date of this regulation, or was granted a variance as provided in the Clear Creek County Zoning Regulations, the property owner shall not be required to remove the structure.
 - b. Where the obstruction is caused by the natural or historic topography of the property, and not by earthwork undertaken by the current property owner or his or her immediate predecessors, the property owner shall not be required to regrade the property in order to remove the obstruction.

If the property owner does not comply within 30 days, further enforcement action shall be taken as provided in Chapter 8 of these regulations.

2.7.4 Above Ground Obstructions:

A 10-foot minimum “clear zone” shall be maintained at all times between the edge of the traveled way for any road and any fixed obstruction including but not limited to utility poles, retaining walls, boulders, or structures of any kind. No fixed obstructions shall be permitted in this minimum clear zone or additional areas as deemed necessary by the Road and Bridge Supervisor. Signs, guardrail, and other road related obstructions designed for vehicular impact may be exempt from the clear zone requirement if approved by the Road and Bridge Supervisor.

Storage of material in any road right-of-way is prohibited. Any material which is stored in the road right-of-way which impedes snow plowing or road maintenance, or which constitutes a hazard to the general public, will be removed by the Road & Bridge Department and the owner billed for the cost of the removal as authorized by Colorado Revised Statutes (C.R.S. Section 43-5-301 et seq.).

2.7.5 Rural Free Delivery Multi Box Modules:

In subdivisions where provisions were not specifically made for rural free delivery multi box modules, the homeowners association, or if one does not exist, a designated group from the subdivision shall be responsible for submitting a proposal to the Road and Bridge Department. The submitted proposal shall first consider locations in front of or adjacent to the property owners requesting the installation of a multi box module. The Road and Bridge Department shall evaluate all sites in front of or adjacent to property owners requesting rural mail delivery before evaluating any other sites. In evaluating the proposal, staff shall determine if the proposed site meets all the following criteria:

1. The Postal Service will provide delivery service to the area proposed.
2. The module shall be a minimum of 10 feet from the edge of shoulder of the road.
3. Adequate space for an 8-foot-wide by 40-foot-long pull off shall be provided.
4. The pull off shall be constructed per the Clear Creek Roadway Design and Construction Manual.
5. A minimum sight distance of 250 feet in all directions shall be provided.
6. The pull off shall not have a grade in excess of 3%.
7. Adequate space for snow storage and removal within the right-of-way or appropriate snow-stack easement shall be provided.
8. The site shall not adversely impact the normal flow of traffic or the surrounding properties.

In addition, the following information shall be provided:

1. If the proposed location is adjacent to private property, the affected property owner(s) shall provide a letter stating they have no objection to the module location.
2. A letter signed by the homeowners association president or other approved individual indemnifying Clear Creek County from any damage that may occur due to normal and routine road maintenance operations (see Figure 11).

Once a site, meeting these criteria, has been located by the proponents shall stake the proposed location of the module and the edge of the right-of-way. The right-of-way shall be staked for a distance of fifty (50) feet on either side of the proposed location of the module. Upon completion of the staking, the Road and Bridge Department and the Postmaster shall inspect the proposed site to ensure all the site requirements are met before giving preliminary approval. After preliminary approval, staff shall notify all property owners within a minimum of three hundred (300) feet of the proposed site and inform them of the request and allow them fourteen (14) days to appeal the staff decision. If no appeals are received in the allotted time, staff will inform the proponents by written notice that they can begin construction once they obtain a right-of-way permit (Chapter 5, Section 5.3). In the event of an appeal, staff will schedule a hearing with the BOCC within (30) days of receiving the appeal request. Property owners originally noticed for the proposal site will be re-noticed for the appeal. Proponents and opponents will have the opportunity to state their arguments supporting their respective positions. The BOCC decision will be final.

After construction has been completed, a final inspection shall be done to ensure the module was properly installed and the pull off was constructed to County standards. All deficiencies shall be corrected before final approval can be given to start mail service.

The homeowners association or other designated group from the subdivision shall be responsible for all costs associated with the construction of the module and pull off and all future maintenance including snow removal of the pull of area.

Individual mail boxes on individual properties will not be allowed in new areas requesting rural mail delivery.

2.7.6 Individual Mail Box Installation Requirements:

Individual mail box installations, on public roadways in Clear Creek County, shall be made in a cantilever style to prevent blockage or obstructing maintenance operations of the drainage channels. Boxes must be installed between forty-two (42) and forty-eight (48) inches above the road surface and positioned so the opening or front of the box is at the outer edge of the shoulder (edge closest to the ditch).

Posts must not be set in the ditch or on the roadway side of the ditch to allow for maintenance operations.

It is the responsibility of the property owner to maintain mail boxes and to clear snow from around mail boxes to allow for mail delivery. (See Figure 12)

2.8 Road Construction Permits and Parking Areas

2.8.1 Requirement for Road Construction Permit:

When road grading of an existing public access road which results in any change to the existing alignment, grade or drainage pattern is proposed, the individual responsible for the construction must obtain approval for a Road Construction Permit from the Site Development Department prior to commencing construction.

2.8.2 Standards for Parking Areas:

A. Parking Index:

The parking Index standards are specified in the Clear Creek County Zoning Regulations, Section 10, Part 1006.1.5.

B. Parking Area Grades:

Parking areas shall have a maximum grade of 4%, and a minimum grade of 1% to facilitate drainage.

C. Surfacing of Parking Area:

Paving is not required for parking areas and driveways serving single-family units, or for duplexes and Recreational Use Facilities with less than 20 vehicle parking spaces where the road providing access is not paved. Where roads are paved, parking areas for duplexes and recreational areas must be paved.

Unless specifically exempted above, parking areas and drives must be paved with a minimum of six inches of road base compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180 and three

inches of pavement; or shall be designed in accordance with Section 2.4.3.C, with TI equaling 6.0.

D. Provision for Drainage in Parking Areas:

Parking area design shall make adequate provision for drainage and prevention of erosion. Drainage from parking areas shall flow to roadside ditches or other approved drainage ways. Drainage from parking areas shall not flow onto roadways. Collection points for runoff across parking areas shall be provided to minimize sheet flow.

E. Placement of Parking Areas on Fill:

If a parking area is to be placed on fill, the fill used shall be a suitable material as specified by a Colorado licensed Professional Engineer. The fill shall be compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180 with slopes at no more than 1½:1 (H:V) and protected by rip-rap to prevent erosion from snow storage.

F. Snow Stack Storage:

Snow storage for parking areas shall be provided on the associated private property. Use of the right-of-way for snow storage by private individuals or companies is prohibited (C.R.S. 43-5-301).

G. Parking Dimensions:

Parking space dimensions and parking lot layout are per Figure 17.

2.9 Landscaping and Erosion Control

Whenever roadway or bridge construction results in earth disturbance, revegetation and reforestation is required. The site plan shall be approved by the Site Development Department and shall be completed during the first planting season after construction. Native or similar horticultural material shall be used. All areas disturbed by construction operations and not otherwise covered by structures or pavement must be seeded, fertilized, mulched, planted and otherwise treated to provide an established stand of vegetation. Cut and fill slopes must be treated to prevent erosion. Areas not disturbed by construction shall be left in their present vegetative state, except that thinning of trees may be required. In no case shall landscaping in the right-of-way or on private property impede the normal maintenance operations of the Road & Bridge Department or the normal flow and operations of traffic. Specific requirements are as follows:

Erosion Control and Environmental Mitigation Efforts for Road Construction

1. The faces of cut and fill slopes shall be prepared and maintained to control against erosion.
2. This control shall consist of effective planting as a permanent control measure.
3. Permanent soil stabilization measures shall be installed within thirty (30) days after final grade is reached. Planting shall occur within the next window of opportunity should construction be completed during winter months.
4. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.

5. Where necessary, check dams, cribbing, riprap or other devices or methods shall be employed to control erosion and provide safety.
6. Preserve existing trees, shrubs and grasses where possible to prevent erosion.
7. No work may interfere with the flow of storm water.
8. Excavations shall be constructed so they are stable.
9. Storm water runoff shall be discharged from the site in quantities and at velocities not to exceed historic levels.
10. All erosion control devices shall be maintained so that they function as designed.
11. Dust emissions (wind erosion) shall be controlled.
12. Temporary erosion protection shall be installed prior to excavation activities.
13. All topsoil shall be salvaged and redistributed.
14. Any applicant creating earth disturbance, shall be required to comply with the Best Management Practices Manual.
15. A specific, scaled, site plan designed by a Colorado licensed Professional Engineer indicating; aspects, scale, site boundary, and adjacent streets or roadways is to be submitted.
16. The site plan is to show existing drainage, rivers, streams, lakes, and wetlands. The gradient and direction of slopes before and after construction, and the disturbed area of the lot, are also to be shown.
17. The site plan must indicate the types, and placement, of temporary and permanent erosion control measures. The plan shall be specific to the schedule for reseeding and replanting. For sites completed during the winter months, or when a final inspection is expected before actual re-vegetative growth occurs, a performance bond may be required.
18. A site plan should indicate a green belt that will remain around the property's perimeter.
19. Road crossings across water courses designated as "Waters of the State" by the Army Corps of Engineers must meet the requirements set forth by the Army Corps of Engineers for permitting before a County permit will be issued.

Chapter 3 – Road and Bridge Construction Specifications

3.1 Purpose and Intent

This section sets forth specific standards for roadway and bridge construction in Clear Creek County and is intended for use by the developers, property owners, contractors and other engaging in the construction of new roads or upgrading of existing roads, the building of bridges and the installation and repair of utility facilities. Specific permit requirements for right-of-way work are detailed in Chapter 5.

3.2 Closing of Streets and Roads

3.2.1 Notice and Operation of Street Closure:

Contractors may only close streets after obtaining approval for an alternative route from the County Road and Bridge Department. A traffic control plan will be submitted in accordance with the Manual of Uniform Traffic Control Devices. Contractors shall furnish, erect and maintain, at their own expense, necessary barricades, suitable and sufficient number of flagmen and take necessary precautions for the protection of the work and safety of the public around their construction operations. If construction operating conditions require closure of a street or road, the **contractor shall provide notice** as follows:

1. Submit a traffic control plan for review and approval by the County Road and Bridge Department a minimum of six (6) working days prior to closing the road. See Chapter 5 Section 5.3.4 for emergency situations.
2. Notify affected Property Owners a minimum of six (6) working days prior to closing the road to mitigate impact of the road closure.
3. Notify the Jeffcom 911 communications center of the exact location of the street and the date traffic will be impeded twenty-four hours prior to closing the streets.
4. Notify the appropriate local papers and/or radio station to announce the upcoming road closure.

3.3 Construction of Roads

3.3.1 Permits Required for Road Construction / Grading:

All construction, grading (excluding snowplowing), parking, and other activity temporarily or permanently excavating or altering a public road surface and/or right-of-way shall require a permit before commencement of the construction, grading, parking, or other activity.

Whenever road grading of an existing or historic access road is proposed the individual responsible for the construction must obtain approval for a Road Construction Permit from the Site Development Department prior to commencing construction.

Grading is defined as any alteration of the existing topography. In general, Road Construction Permits are required for changes to a road's horizontal or vertical alignment, or for changes to drainage infrastructure.

- A. The submittal requirements and procedure for obtaining road construction permits are as follows (Refer to Table 18 for utility line installation depths):
 1. No permit will be issued without the submittal completed applications along with the appropriate engineered drawings and specifications.

2. No permit will be issued before the fees set forth on the Site Development Department Fee Schedule have been paid in full and, if required, Performance Guarantee (see 3.31.C) has been deposited with the County.
 3. Erosion controls detailed in the Best Management Practices Manual and as required by the Site Development Department shall be utilized for all road construction projects.
 4. A copy of the approved permit and plans are to be kept available on-site. Alterations to the plans are to be noted, and the plans are to be turned into the Site Development Department as "as-built" diagrams upon final inspection. The Site Development Department will inspect field work at appropriate stages of construction.
 5. At completion of the project, a final inspection is held to confirm compliance with the permit requirements. Approval at this inspection begins the "Warranty Period". Rejection will require remedial action.
 6. The contractor is responsible for adequate traffic control and traffic safety in accordance with the MUTCD.
 7. The Site Development Department will require testing by a soils engineer, at no cost to the County, if he/she believes that hazardous geological factors exist. If a soils engineer finds that hazardous factors do exist, the applicant will be required to conform to the engineer's plan.
 8. Owners of the property or business abutting the road construction project shall be advised, by the applicant, of the permit application that may affect their convenience and economic well-being.
- B. A Performance Guarantee is required for road construction permits in the amount of 125% of the estimated cost of the proposed scope of work. These amounts shall be based on contract prices or other acceptable cost estimates for performing such work, as specified and approved by the Site Development Department. The Performance Guarantee is to ensure completion of the work in accordance with approved plans and without damage to the road or right-of-way.
1. All Performance Guarantees will be (i) in cash, together with an executed Security Agreement, or (ii) by Letter of Credit issued by a bank physically doing business in the state of Colorado, drawable in the state, and in a form acceptable to the County Attorney.
 2. The Performance Guarantee will be released upon completion of a "warranty period" of one (1) year after completion of the work on gravel roads and two (2) years after the work on asphalt roads if, at that time, the work has not failed. If the work has failed, and the permittee fails to promptly correct the work, the work will be repaired by the County at permittee's expense. If the Performance Guarantee does not cover the cost of repair, the permittee must pay the balance upon billing, and no further permits will be issued the permittee while a balance is outstanding unpaid.
 3. The work will be deemed complete for the purpose of starting the warranty period upon final inspection approval by the Site Development Department and delivery of an acceptable as-built drawing to the Department.
 4. A letter of credit Performance Guarantee will be drawn on if the conditions for its release are not satisfied within ten business days before its expiration, unless prior to that time a replacement letter of credit or extension is delivered to the Site Development Department.

5. A partial release will be considered by the BoCC upon receipt of a written request by the developer.
6. The permit applicant is responsible for adequate traffic control and traffic safety in accordance with the Manual of Uniform Traffic Control Devices (MUTCD).
7. Any work that has begun, involving any of these permits, prior to permit issuance shall be penalized the amount of the permit fee.
8. Applications for permits shall be made on standard forms provided by the Site Development Department and permits will be issued on official forms.
9. Owners of property or business abutting utility projects shall be advised of permit applications that may affect their convenience and economic well-being (See Section 3.2.1.2).
10. All proposed road closures must be approved by the Road and Bridge Department and will be limited in the number of hours possible per day.

3.3.2 Construction Testing:

Quality control supervision of construction shall be done by a qualified geotechnical consultant at no expense to the County. The County inspector shall be permitted access to the construction site at all times to make spot checks of quality control. Any additional testing or corrective work deemed necessary shall be done within the time determined by the Site Development Department at no expense to Clear Creek County. The contractor or developer must contact the Site Development Department forty-eight (48) hours in advance of the required final inspection.

A. Sampling of Materials:

Samples for preliminary approval or production control may be submitted by the producer to the geotechnical consultant. The geotechnical consultant must use the Colorado Division of Transportation (CDOT) applicable procedure outlined in the latest edition of the Field Materials Manual to determine the acceptability or rejection of the sample.

B. Field Density Determination:

To determine the compacted in-place density of soil and soil aggregate, the geotechnical consultant may use applicable CDOT procedures outlined in the latest edition of the Field Materials Manual.

C. Periodic Inspection During Construction:

The Site Development Department shall conduct periodic inspections during construction to assure compliance with approved grading and construction plans. The Department may establish checkpoints when inspection must be conducted and approvals granted before construction is continued as part of issuing a road construction permit.

D. Final Inspection:

Upon completion of construction and prior to County approval of the completed work, copies of the as-built plans, concrete cylinder test reports, compaction test reports and other test data shall be delivered to the Site Development Department. In addition, a certification shall be given by the developer's engineer that construction has been completed in conformance with the

approved lines, grades, specifications and standards (see Section 1.8.1). The Site Development Department shall conduct an inspection to determine if the construction meets County standards and specifications. If the inspection discloses any work, in whole or in part, as unsatisfactory, the Site Development Department shall give the developer's engineer the necessary instructions for correction and the developer shall comply with and execute such instructions. At the discretion of the Site Development Department, the County may withhold: The Performance Guarantee, the granting of further building permits or any occupancy permits for the project until such time corrective work is completed.

3.3.3 Site Preparation:

A. Utilities Protection:

The developer and contractor shall at all times take proper precautions to assure the protection of utilities, service lines, or other public or private installations and shall be responsible for the repair of any damage. The developer or contractor shall notify the utilities forty-eight (48) hours before excavation begins, so the utilities can locate the services.

B. Grubbing:

All large rocks, brush debris, structures and all other unsuitable material shall be cleared to a depth of at least twelve (12) inches below subgrade or as directed by the Site Development Department and be replaced with suitable material. Locating suitable disposal sites shall be the responsibility of the contractor or developer subject to County approval. Trees, except those designated to be saved, and all stumps shall be removed to a depth of at least eighteen (18) inches below the finished subgrade elevation. All trees designated to be saved shall be protected during clearing and subsequent construction operations. Suitable material removed from the excavation may be used in so far as practical, in the formation of embankments, backfilling and for such other purposes.

3.3.4 Structural Embankment Construction:

Embankment construction consists of constructing roadway embankments, including preparation of the areas upon which they are to be placed; constructing dikes within or outside the right-of-way; placing and compacting of embankment material in holes, pits, and other depressions within the roadway area. Only approved materials shall be used in the construction of embankments and backfills.

A. Benching:

When an embankment is to be placed and compacted on slopes steeper than 4:1 (25%), the roadway shall be continuously benched over those areas. A bench is required at vertical intervals of ten feet maximum or as required by the Site Development Department. Benching shall be well keyed and where practical, a minimum of eight feet wide. Each horizontal cut shall begin at the intersection of the original ground, and the vertical sides of the previous cuts. Material thus cut out shall be recompacted along with the new embankment material at the contractor's expense.

B. Compaction:

Minimum compaction shall be 90% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180.

C. Rip-rap:

Where embankments encroach on stream channels or lakes, calculation of the flows or wave action shall be made and submitted to the County. Based on these calculations, the Site Development Department shall determine the appropriate size rip-rap and this rip-rap shall be placed along the toe of the slope to protect embankments against erosion from water action.

D. Prohibited Materials:

Organic and wet or frozen material shall not be used for any structural embankment construction.

3.3.5 Trench Excavation:

Trenches shall be excavated to that pipes can be laid straight at uniform grade, without dips or humps, between the terminal elevations shown on the drawings. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed and compacted to an elevation twelve inches above the top of the pipe before the trench is excavated.

A. Trench Widths:

Trenches shall be excavated to a width which will provide adequate working space and side clearances for proper pipe installation, jointing and embedding. Minimum trench widths at or below and elevation six inches above the top of installed pipe shall not be less than OD plus twenty-four inches.

B. Excavation Below Pipe Subgrade:

Except where otherwise required, pipe trenches shall be excavated below the underside of the pipe, as shown on Figure 18 and 19, to provide for the installation of granular embedding pipe foundation material.

C. Bedding Material:

Bedding material for rigid pipe shall be a minimum of 4 inches of loose structure backfill (CDOT Class 1 or 2), as shown on Figure 19.

D. Placement and Compaction:

Granular bedding material shall be spread and the surface graded to provide a uniform and continuous support beneath the pipe at all points between bell holes or pipe joints. It is permissible to slightly disturb finished subgrade surface by withdrawal of pipe slings or other lifting tackle.

After each pipe has been graded, aligned, and placed in final position on the bedding material and shoved home, sufficient pipe embedding material shall be deposited and compacted under and around each side of the pipe jointing and embedding operations. Bedding material shall be

deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

Bedding material shall be compacted to the top of the pipe in all areas where compacted backfill is specified.

Whenever crushed rock is used as bedding or thirty-six inch and larger pipe, the portion above the bottom of the pipe shall be vibrated with a mechanical vibratory compactor during placement to ensure that all spaces beneath the pipe are filled.

The method of compaction and the equipment used shall be appropriate for the material to be compacted, and shall not transmit damaging shocks to the pipe. Job excavated material shall be compacted to 90% of the maximum dry density except for the final two feet which will be compacted to 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by the AASHTO Method T-180.

E. Backfill Over Concrete:

All backfill over concrete shall conform to the following requirements:

1. **Initial Backfill:** To aid curing, no more than eight inches of loose backfill shall be placed over concrete after the concrete has reached its initial set.
2. **Final Backfill:** Additional backfill shall not be placed over arch encasement or blocking until the concrete has been in placed at least three days.

F. Compacted Backfill:

Compacted backfill shall consist of suitable job excavated-material, finely divided and free from debris, organic material, cinders or other corrosive material and stones larger than three inches in greatest dimension. Masses of moist, stiff clay shall not be used. Job-excavated materials shall be placed in uniform layers not exceeding eight inches in uncompacted thickness. The method of compaction and the equipment used shall be appropriate for the material to be compacted, and shall not transmit damaging shocks to the pipe. Job excavated material to be compacted to 90% except for the final two feet which will be compacted to 95% of the maximum dry density at optimum moisture content as determined by AASHTO Method T-180. Compacted backfill is required for the full depth of the trench above bedding in the following location:

1. beneath driveways, parking areas, road or other construction or structures; or
2. in driveway and parking area shoulders; or
3. beneath fills or embankments.

3.3.6 Culverts:

This section covers corrugated metal pipe used for a minimum eighteen-inch storm drains beneath roads. Culvert sizing shall be in accordance with Section 2.4.3.D of this Manual. Corrugated metal pipe or approved equal shall be furnished and installed with all jointing materials, accessories and appurtenances as indicated on the drawings and as specified.

A. Materials:

Materials used for storm drains shall conform to the applicable AASHTO provisions of the "Standard Specifications for Highway Materials."

1. **Circular Pipe:** Corrugated metal pipe shall be AASHTO M36-78 and galvanized with 2 $\frac{3}{8}$ " x $\frac{1}{2}$ " corrugations. The corrugations may be annular or spiral with annular ends.
2. **Coupling Bands:** All field joints in corrugated metal pipe will be made with coupling bands, fabricated from the same material as the pipe. Coupling bands for field joints in corrugated metal pipe for all culverts shall be the pipe manufacturer's standard coupling band type.
3. **End Sections:** Flared metal end sections shall be provided on all culverts unless otherwise specified by the Road and Bridge Supervisor. The end sections shall be fabricated from 16-gauge galvanized sheet metal for 36-inch diameter and larger pipe. The end sections shall be provided with a rolled reinforced edge and a galvanized top finish plate.

B. Handling:

Pipe, couplings, and accessories will be handled in a manner that will ensure installation in sound, undamaged condition. Equipment, tools and methods used in unloading, reloading, hauling and laying pipe will be such that the pipe is not damaged.

C. Cleaning:

The interior of the pipe and any couplings shall be thoroughly cleaned of all foreign matter before being installed. Before jointing, all joint contact surfaces shall be wire-brushed, if necessary, wiped clean and kept clean until jointing is completed.

D. Installation:

1. **Installation Requirements:** Corrugated metal pipe shall be laid true to the grade required by the drawings, and shall be installed in accordance with the following requirements:
 - a. **Pipe:** The pipe shall be installed in accordance with the details indicated on Figure 20 and 21 and the applicable portions of the excavation section. The pipe shall be protected from lateral displacement by means of a pipe embedding material as specified for trench backfill. The minimum cover for corrugated metal pipe is 12 inches.
 - b. **Couplings:** Sections of the corrugated metal pipe shall be joined together using metal coupling bands, centered on the joint and with the pipe sections as close together as possible. Each coupling bank shall be bolted in place and tightened sufficiently to ensure a tight joint and to form a continuous conduit capable of resisting all stresses. Pipe shall not be laid in water or under unsuitable weather or trench conditions.
 - c. **End Sections:** The end sections shall be attached to the culvert by threaded rod and connecting lug.
 - d. **Rip-Rap:** Culverts shall have a rip-rap bed of 10 feet in length by 10 feet in width or the width of the ditch which is less at the inlet for erosion control. The rip-rap shall consist of hard, dense, sound, rough fractured rock as nearly cubic as practical. Pit run or dredge rock can be substituted. Each rock shall have a

minimum volume of 0.25 cubic feet (approximately 30 pounds) per stone. Slab type and flaking rocks shall not be used.

2. **Use of Culverts at Access Point of Roads:** Driveways or road connections to a County road shall not be constructed in such a way as to impede the normal flow of drainage in roadside ditches, culverts, underdrains, bridges or other drainage works, or to cause such drainage to flow onto or across the driving surface of a County road. In the event that such an impediment results in damage to a County road, the Road and Bridge Supervisor may remove the impediment and bill the property owner for the costs of repairs to the road, including labor, equipment and material.

In certain instances, a culvert may not be required by virtue of the topography. In that event, a written waiver must be obtained from the Road & Bridge Department. Such a waiver does not constitute a waiver of the permit fee, inspection of the access or any requirement of the access

3.3.7 Subgrade:

The bottom of the excavation or top of the fill is considered the subgrade, and shall conform to the lines, grades and cross sections shown on the plans.

A. Subgrade Specifications:

Soft, spongy or frozen subgrade shall be removed as directed and replaced with suitable granular material placed and compacted as specified in Section 3.3.4.

B. Compaction:

Before subbase construction begins, soils in subgrade shall be compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180.

3.3.8 Gravel Roads:

Gravel roads shall consist of a compacted subbase to 50% of the design thickness and the remainder compacted base course.

A. Gravel Specifications:

Gravel used in road construction shall be crushed to a required size and a filler of sand or other finely divided mineral matter must be used. The portion of material retained on a No. 4 sieve is considered filler. At least 50% by weight of the course aggregate particles shall be particles having at least one fractured face. The gravel shall be screened if necessary to meet this requirement or to eliminate an excess of filler. The composite base course material and subbase course shall be free from organic matter and meet the grading requirements in Table 13.

B. Compaction of Subbase or Base Course (Gravel Roads):

The subbase or base course shall be placed and spread in a uniform layer and without segregation of size to a depth not exceeding eight inches or uncompacted material. The material

will be compacted to at least 95% of the maximum dry density as determined by AASHTO Method T-180.

C. Manholes:

On gravel roads where manholes or water valve boxes are located in the roadway, they must have a minimum of five inches of cover at finished grade.

D. Dust Abatement:

An appropriate dust abatement material may be applied to all gravel roads in residential areas or as deemed necessary by the Road and Bridge Supervisor. All gravel roads with traffic volumes greater than 200 average daily traffic must be treated.

3.3.9 Asphalt Roads:

A. Subbase Specifications:

Placement of subbase material shall conform to the lines, grades, cross-sections and thickness shown on the approved plans and shall be finished and maintained in as acceptable condition prior to base construction. Subbase material shall be well mixed, free of organic and frozen matter and lumps or balls of clay, and shall consist of sound aggregate particles. Subbase material must conform to the limits established in Table 13.

B. Base Course:

- 1. Base Course Specifications:** Placement of base material shall conform to the lines, grades, cross-sections, and the thickness shown on the approved plans. Base material shall consist of hard, durable particles or fragments of stone or gravel crushed to the required size and a filler of sand or other finely divided mineral matter, base material shall be free from organic and frozen matter, lumps or balls of clay. When placed and compacted, it shall result in a firm, dense, unyielding foundation. Base material shall meet the specifications shown in Table 14. In general, the lower portions of the base course shall be constructed of Class 5 material, except that a minimum of the top three inches of all base course shall be constructed of Class 6 material. The base course materials when tested in accordance with AASHTO Standard Test Designation T-96, shall have no more than 50% wear.
- 2. Compaction of Base Course (Asphalt Roads):** Base material shall be deposited and spread without particle segregation in loose layers not to exceed six inches in depth or when compacted, the layer shall have a thickness not to exceed four inches. The material shall be compacted to at least 95% of the maximum dry density as determined by AASHTO Method T-180. Base course shall not be placed upon a soft, spongy, frozen subgrade or subbase.

C. Asphalt Concrete Pavement:

- 1. Materials to be Used:** The asphalt concrete pavement shall consist of a mineral aggregate, uniformly mixed with asphalt cement, laid upon the prepared base to the finished thickness shown in the typical cross-sections on the plans. The mineral aggregate shall be 100% crushed gravel. All materials, methods of preparation and construction shall conform to the following requirements.

- a. **Crushed Gravel:** The gravel to be used shall consist of clean, hard, durable particles which have been crushed to the gradations specified on Table 15. Of the particles retained on the No. 4 sieve, at least 60% by weight shall have one or more fractured faces. The crushed gravel when tested in accordance with AASHTO Standard Test Designation T-96, shall have no more than 50% wear and shall show no detrimental amount of stripping when tested. Determination of the effect of water on the cohesion (stripping resistance) of asphaltic concrete composed of the proposed mineral aggregates shall be made in conformance with AASHTO Standard Test Designation T-165-77 with a minimum dry strength of 200 psi with a minimum retained strength of 75% of the dry strength.
 - b. **Asphalt Cement:** Asphalt used in road construction shall be uniform in character, free from water and shall no foam when heated to 347 degrees F. All asphalt shall contain an anti-stripping additive, and shall comply with the following test designations:
 - I. If graded by penetration, it shall be in accordance with AASHTO Test Designation T-49-78.
 - II. If graded by viscosity, it shall be in accordance with AASHTO Materials Designation M-226-78.
2. **Establishing Job Mix Formula:** The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of bituminous material to be added to the aggregate and a single temperature for the mixture at the discharge point of the plant. After the job mix formula is established, all mixtures furnished for the project shall conform to the following ranges of tolerances:
- Passing No. 8 and larger sieve more or less 8%*
 - Passing sieves smaller than No. 8 to larger than No. 200 more or less 6%
 - Passing No. 200 more or less 3%
 - Bitumen more or less 0.5%
 - Temperature of mixture when emptied from mixer more or less 20 degrees F
- *Exclusive of the maximum size designated
3. **Sampling and Testing:** All sampling and testing of materials shall be done in accordance with the latest methods of the AASHTO. The Road and Bridge Supervisor shall be supplied with a Certificate of Compliance with the Colorado Department of Transportation Specifications before any asphalt is placed.

D. Construction of Asphalt Roads:

- 1. **General Conditions:** Bituminous plant mix shall be placed only on properly constructed and accepted layers that are free from water, snow and ice. The bituminous mixture shall be placed within the air temperature limitations as shown in Table 16 and only when weather conditions otherwise permit the pavement to be properly placed and finished.
- 2. **Pavement Thickness:** When asphaltic concrete pavement thicknesses in excess of 3 inches are called for, they shall be laid in separate courses of not less than 1½ inches nor more than 3 inches. The thicknesses called are finished thicknesses after compaction.
- 3. **Joints:** Longitudinal and transverse joints shall be well bonded and sealed. Joints shall be painted with cutback asphaltic cement where necessary to obtain this result. In making

the joint along any adjoining edges such as curb, gutter or an adjoining pavement and after the hot mixture has been placed by the finishing machine, just enough of the hot material shall be carried back to fill any space left open. The joint shall be properly set up with the back of a rake as proper height and level to receive the maximum compression under rolling.

Joints between old and new pavements or between successive days works shall result in a through and continuous bond between the old and new surfaces. The edge of the previously laid course shall be cut back to its full depth to expose a fresh surface, after which the hot mixture shall be placed against it and raked to a proper depth and grade. Hot smoothers or tampers shall be used to heat the previously laid pavement (without burning it) to ensure a proper bond. Before placing mixture against them, contact surfaces of curbs, gutters, headers, manholes, etc., shall be painted with a thin, uniform coating of cutback asphalt cement.

4. **Irregularities:** Immediately after the course is screened and before roller compaction is started, the surface shall be checked, any inequalities adjusted, all fat sandy accumulation from the screen removed by a rake or hoe and all fat spots removed and replaced with satisfactory material. Irregularities in alignment and grade along the outside edge shall also be corrected by the addition or removal of mixture before the edge is rolled. Special attention shall be given to the straightening of each course immediately following the initial rolling.
5. **Final Compaction:** Final compaction shall result in a course which is smooth and true to the established crown and grade. It shall have the average thickness specified and shall at no point vary more than $\frac{1}{4}$ inch from the thickness specified. Any mixture that becomes loose and broken, mixed with dirt or in any way defective, shall be removed and replaced with fresh hot mixture, which shall be compacted to conform with the surrounding area. The surface of the finished pavement shall be free from depression exceeding $\frac{1}{2}$ inch in ten feet as measured by a ten-foot straight edge measured in any direction or an automobile mounted recording profilometer.
6. **Testing after Final Compaction:** The asphalt concrete pavement shall at no point have a density less than 93% of the maximum density possible to obtain a voidless pavement composed of the same material in like proportions. Field density determinations will be made in accordance with Colorado Department of Transportation #44 and #81.

E. Drainage Pans:

Drainage pans may be used where approved by the Road and Bridge Supervisor. Pans should be used exclusively for the use of drainage and not for speed control dips. The drainage pan design shall conform to the design as shown in Figure 22.

3.4 Landscaping Installation

Earth cuts, embankment slopes and all other areas where the ground cover has been disturbed during the course of road construction shall be re-vegetated and reforested equal to or better than conditions existing prior to construction. Landscaping material shall be installed in accordance with plans approved as part of any road construction permit, and shall be fertilized, mulched, watered and otherwise treated

to provide an established stand of vegetation by the end of the first full growing season after completion of construction. The individual responsible for road construction shall post a performance bond, guaranteeing 50% success at re-vegetation and reforestation, for at least two full growing seasons following installation. (See Chapter 2, Section 2.9)

Chapter 4 – Driveway Permit Requirements

4.1 Purpose and Intent

Driveway permits must be obtained whenever an individual proposes to construct and connect a driveway to an existing public or private roadway in unincorporated Clear Creek County. The reason for requiring driveway permits is to mitigate hazards to public health, safety and welfare; to ensure the design of the connections meets the specifications in these regulations allowing for emergency vehicle access; and for proper drainage. Driveway permits are also intended to ensure adequate reconstruction and/or repair of any damage caused to the County right-of-way or roadway during construction of the connection. Driveway permits shall be obtained before building permits may be issued. This standard supersedes Resolution 00-24.

4.2 Permits and Performance Guarantees

Individuals proposing to construct a driveway connection to an existing County roadway shall obtain an approved driveway permit as provided in Section 4.3. Before undertaking any excavation , a Performance Guarantee may be required.

4.3 Procedures/Requirements for Issuance of Driveway Permits

Procedures for obtaining Driveway Permits are detailed in Section X102.4 of Appendix Chapter X of the Clear Creek County International Code Series.

1. Fee scheduling will be set for various permits, inspections, and on-site approvals. Permit fees will be periodically reviewed by the County for adequacy, and when appropriate the fee schedule will be revised.
2. The property owner/owners are responsible for obtaining all necessary easements and/or CDOT Access permits prior to the application of the Driveway Permit. A copy of the easement and/or CDOT Access permit must be attached to the permit application.
3. The permit holder assumes the responsibility to have buried gas lines, telephone cable and other utilities located by contacting the Utility Notification Center of Colorado.
4. Applicant represents all parties in interest, and affirms that the driveway approach is to be constructed for the purpose of securing access to the described property.
5. Permit holder or authorized agent shall furnish all labor and materials, perform all work, and pay all costs in connection with the construction requested.
6. The permit holder shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this code, and the permit holder shall engage consultants, if required, to provide professional inspections on a timely basis. In the event of changed conditions, the permit holder shall be responsible for providing revised plans for approval.
7. Permit holder shall protect the traveling public during the installation of the driveway and building site excavation with approved traffic control, as outlined by Part VI of the Manual of Uniform Traffic Control Devices. Right-of-way permits shall be obtained whenever a developer, contractor, owner, utility company or other individual proposes to install utility lines, culverts or any other work within the County right of way.
8. The County shall be held harmless against any action for personal injury or property damage sustained by reason of the exercise and issuance of the permit.

9. Failure to comply with any portion of these driveway design standards and permit procedures shall be sufficient grounds for denial, suspension, or revocation of any necessary permit. Financial penalties may also be imposed.

4.3.1 Submittal Requirements for Driveway Permits:

Submittal requirements for Driveway Permits are detailed in Section X102.4.1 of Appendix Chapter X of the Clear Creek County International Code Series.

4.3.2 Action on Driveway Permits:

Applications for driveway permits shall be submitted to the Site Development Department for review and action. Approval shall be granted only if the proposed driveway or roadway connection meets the specifications in these regulations and the required fee has been paid. Approval of a driveway permit may be accompanied by any condition deemed reasonable by the Site Development Department to ensure protection of health, safety and welfare and compliance with these regulations. Applications for driveway permits must be submitted at least 15 calendar days prior to planned commencement of construction, and construction cannot commence without permit approval.

4.3.3 Construction Specification for Driveway Work:

All work undertaken to connect driveways to existing County roadways shall conform to the standards contained in this Manual as well as Appendix Chapter X of the Clear Creek County International Code Series. In the event of a discrepancy between the regulations, the more stringent requirements shall apply.

4.3.4 Construction Schedule for Driveway Work:

As part of its approval of any driveway permit, the Site Development Department shall also approve a construction schedule. The approved schedule shall not be changed after the permit is issued without the written consent of the Site Development Department and approved by the Road and Bridge Department.

4.4 Supervision of Driveway Work

All driveway work shall be completed under the supervision of the permit holder. The permit holder shall at all times conduct work within County right-of-way so as to avoid obstruction and hazard to the traveling public. Materials necessary for construction of driveway access points to the County roadway shall not be stored on the County right-of-way at any time. The roadway and roadside area where driveway access work has been performed shall be thoroughly cleared of all debris and extraneous material and shall be restored to a condition equal to or better than the original when construction is concluded.

4.5 Inspection and Testing of Driveway Work

Adequate inspections ensure compliance with County requirements. In-progress inspections of all elements of work will eliminate the need of extensive post testing. At least one inspection at the conclusion of construction is required. In making this inspection, the Site Development Department shall check for compliance with these regulations, specific permit conditions and approved plans, and also for adequate cleanup of roadway surfaces and the right-of-way. Certificates of Occupancy shall not be

issued by the Building Department until driveway work is determined to be satisfactory by the Site Development Department.

Any work or material determined not to conform to these regulations as well as any pavement failures or broken asphalt, damaged signs or fencing, and remaining debris either in the roadway or adjacent property, or improper drainage reported to and observed by the Site Development Department shall be brought to the attention of the permit holder both verbally and in writing. Any work in which untested or unaccepted materials are used shall be ordered removed and replaced at the permit applicant's expense. Any required corrective work shall be made at the permit applicant's expense and shall be done to the satisfaction of the Site Development Department. If immediate corrections are not made, further project construction shall be stopped.

In determining whether or not the driveway work done by the permit holder is acceptable, the Site Development Department may consult with the Road and Bridge Department. If a determination is made that testing by a third party is required, the number and location of the tests shall be determined by the Site Development Department and the cost of such testing shall be paid by the permit holder. If the Site Development Department determines testing by an independent lab is necessary, the cost of such testing shall be paid by the permit applicant.

4.6 Responsibility for Rework on Driveway Connections

The permit holder shall be fully responsible for the maintenance and correction of any faulty construction, including unstable road cuts and potholes developed during the construction period and for a period specified in Chapter 5, Section 5.10. All deficiencies shall be resolved to the satisfaction of the Road and Bridge Department. Failure to do so could be cause for denial of future permits.

4.7 Driveway and Parking Areas

4.7.1 Requirement for Driveway Permit:

Whenever a property owner, developer, contractor or other individual proposes to connect a driveway or parking area to the public roadway, they must obtain approval for a Driveway Permit from the Site Development Department prior to commencing construction.

4.7.2 Requirement for Grading Permit:

When road grading of an existing road on private property is proposed the individual responsible for the construction must obtain approval for a grading permit from the Site Development Department prior to commencing construction.

4.7.3 Standards for Driveway Design:

A driveway is defined as an accessory for vehicles providing a connection from a public or private roadway to either individual single-family residences or to a parking area serving multi-family residences; commercial businesses; recreational, institutional, or industrial land uses. For purposes of this regulation only, single family residences shall be defined as individual detached houses or duplexes (two single family residences) either of which are on individual platted lots or on footprint lots with surrounding property held in common ownership. If an accessway serves more than five (5) individual single-family residences, it shall be classified as a roadway rather than a driveway and must meet the

County's standards and requirements for road construction. A driveway may provide access to a common parking area for multi-family residential development if the development meets all Clear Creek County regulations for multi-family development. An accessway serving a working ranch or farm and any associated residence regardless of length shall be considered a driveway, and shall meet only such standards as are necessary for public health and safety and as outlined in this section.

A. Location of Driveways Relative to Intersections:

Driveways shall be placed so the following minimum distances are maintained to any street intersection.

Where the driveway connects to a local access or low volume road, a minimum distance of 50 feet from curve return to edge of right-of-way at the intersection shall be maintained. If the required driveway separation distance cannot be met for a T-intersection of two roads, the driveway shall be aligned as close to opposing road as possible.

Where a driveway connects to a collector or larger road, a minimum distance consisting of the left turn stacking distance plus 20 feet as measured from outside of flares, shall be maintained (see Figure 16). The left turn stacking distance shall be determined by the Road and Bridge Department based on an acceptable traffic study. If a traffic study is not available, or data provided is incomplete, the Road and Bridge Department shall estimate the length of the left turn stacking distance.

B. Spacing of Driveways:

Driveway openings shall be separated by at least 30 feet, as measured from outside of flares, or else shall be combined. More spacing may be required for traffic safety and proper traffic operation.

C. Shared Driveways:

Developers or property owners proposing the use of shared driveways shall record an easement defining the location of the driveway in a form acceptable to the County.

D. Horizontal Alignment and Horizontal Curves:

1. The dimensions of driveway widths, openings, centerline curve radii and turnout spacing shall be as shown in Table 12. Turn Out dimensions are given in Figure 23.
2. All driveways exiting onto collector roads, roadways with average daily counts greater than 700 vehicles per day, or driveways in excess of 100 feet shall be designed with a vehicle turnaround within 50 feet of the dwelling unit to avoid vehicles having to back onto the roadway when exiting (See Figure 24). Driveways serving multi family, industrial, or commercial developments shall provide a turnaround as specified in Figure 7 if the driveways dead ends.
3. Driveways serving single-family residences must be either graveled or paved. Where roads are paved, driveways serving duplexes must be paved. Where a driveway is to be graveled the surface shall be constructed of four inches of road base compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180. Where driveway serving a

single-family residence or duplex is to be paved, the surface shall be constructed of four inches of compacted road base and two inches of pavement that can be placed in one lift.

4. Driveways serving multifamily residences, commercial or non-residential uses must be designed in accordance with Section 2.4.3.C., with TI equaling 6.0. Single-family and duplex residences may only have one access point onto the County road system unless a minimum separation of 250 feet can be provided. Otherwise, looped driveways are not allowed. Where a lot has two different roads to provide driveway access, access shall always be onto the road with the lowest functional classification.

E. Driveway Cross Section:

1. Driveways constructed on natural slopes greater than 20% shall be super-elevated toward the cut slope as shown in Figure 13.
2. Driveways constructed on natural lateral slopes less than 20% may be crowned as shown in Figure 14.

F. Vertical Alignment and Vertical Curves:

1. Driveways shall have a maximum grade of 8% for the first 25-feet from the connection to the road.
2. Grades less than 1% are not allowed.
3. The maximum allowable grade on straight sections of driveway is 12%.
4. The maximum allowable grade on sections of driveway with a radius of less than 50 feet is 8%, as measured along the center line.

G. Cut Slopes:

1. Cut slopes may be constructed as steep as 1½:1, but only where lot line proximity or building site natural grade imposes restrictions (30% slope and greater).
2. Cut slopes steeper than 1½:1 require a stability report prepared by a Geotechnical (Soils) Engineer confirming competent slope material prior to approval from the county.
3. In areas of solid rock, slope shall not be cut steeper than 1:1. Slopes steeper than 1:1 require a stability report prepared by a Geotechnical (Soils) Engineer confirming competent slope material prior to approval from the county. Exposed rock faces shall be free of all loose material.
4. All slopes shall be made sufficiently stable to prevent failures. Steep driveway cut slopes not in solid rock, require retaining wall built to prevent slope failure.
5. Retaining walls require plan submittal and approval by the county. All retaining walls with a vertical height greater than 4 feet shall be of an engineer approved design.

H. Fill Slopes:

1. Fill slopes may be constructed as steep as 1½:1, but only where lot line proximity or building site grade imposes restrictions (30% slope and greater).
2. Fill slopes constructed at a 1½:1 slope shall be constructed so that the toe of the slope is keyed into the natural slope and/or supported by a retaining wall.
3. Retaining walls with heights greater than 4 feet shall be designed and certified by an engineer.
4. Organic materials shall not be placed in fills. Rock material with a maximum dimension greater than 12 inches shall not be buried or placed in fills.

5. Rock disposal areas are to be delineated prior to issuance of driveway and excavation permits
6. Fills shall be compacted to a minimum of 90% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180.

I. Drainage:

1. All driveway accesses from existing private or public roads, which interfere with a natural or constructed drainage course, shall provide a drainage culvert. The culvert shall be a minimum of 18" diameter, but will carry the flow of a 10-year storm event, and be positioned offset to the drainage ditch centerline, away from the traveled portion of the access road.
2. Cross road drainage will be provided at a minimum of every 800 feet or where an identifiable drainage course is defined.
3. Culverts under driveways at intersections shall be of sufficient length to properly fit the radius of flare required and shall be no more than 30 feet in length unless otherwise approved by the Road & Bridge Department.
4. Culvert inlets and outlets shall be designed to cause minimal erosion, and erodible soils shall be adequately protected by riprap, flares, or energy dissipaters.
5. All springs, seeps or bogs evidenced within the proposed driveway shall be treated with a subsurface drainage treatment approved by the county.
6. All driveway culverts shall have a minimum of 6 inches of cover unless otherwise approved by the Site Development Department.

J. Construction Plans and Specifications:

1. All work shall be performed as specified in the latest edition of these standard specifications and any referenced manuals indicated herein.
2. Geotechnical reports analyzing soil and geotechnical conditions on site and recommending how ground is to be prepared to receive fills, how fill slopes are to be designed and compacted and the design of buttress fills and cut slopes to be allowed with respect to these conditions shall be prepared by a qualified geotechnical engineer or professional geologist.
3. Grading plans and specifications shall be prepared and signed by a Professional Engineer licensed in the State of Colorado having knowledge and experience in civil engineering. It is the responsibility of the civil engineer or other qualified professional to incorporate all recommendations from the geotechnical report into the grading, drainage, erosion, and water quality control plans and specifications.

K. Fire Protection and Emergency Access:

1. Emergency access must be maintained at all times.

L. Embankments and Stabilization:

1. Fill shall be developed generally in horizontal layers of similar materials for their length and width, and compacted to a minimum of 90% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180.

M. Intersections:

1. Intersections shall meet at right angles of each other. With supporting justification, a relaxation of up to 15° can be requested from the county.

2. The portion of driveway though the right-of-way connecting the property with the physical roadway shall be the shortest perpendicular distance possible.
3. Driveways shall be sloped down and away from the road at a minimum of 2% for the length of the Right-of-Way but no less than 10 feet.
4. Driveways shall maintain a grade equal to or less than the crown slope of the road from the point where the driveway meets the road to where the driveway crosses the ditch line (Figure 15).
5. No horizontal curves shall carry onto the existing County Right-Of-Way in the design of the driveway or private road.
6. Driveways shall be designed and located to provide a minimum sight distance clear of all obstructions, natural or man-made, for at least 200 feet in either direction on local access roads and 400 feet on collector roads.

N. Signs and Delineation:

1. All signage, delineation, and mounting devices on driveway approaches, adjacent to the county roadway but within the Right-Of-Way, shall be in conformance with the Manual of Uniform Traffic Control Devices, the most recent Colorado Supplement, and the County Sign Regulations.
2. All necessary delineation must be installed prior to County approval.
3. Stop signs shall be installed at the junction of a driveway with a roadway for all driveways serving six (6) or more residential units, commercial shopping areas, or when required by the Road and Bridge Supervisor for protection of public safety.

O. Utilities:

1. Overhead utilities shall at least meet minimum vertical clearances specified by the utility company or Colorado Public Utilities Commission requirements above the driveway and in no case shall the vertical distance be less than 16 feet 6 inches.

P. Bridges:

1. See Section 2.61 and 2.62.

Q. Maintenance:

1. The property owner/owners assumes responsibility for the maintenance of the driveway approach. All snow, ice, or sleet removal from the portion of the driveway approach, including that deposited on the driveway in the course of snow removal operations by the County Road and Bridge Department, is to be done by the property owner.
2. Pushing snow from a driveway onto a County roadway is prohibited. Snow storage for driveways shall be provided on the owner's property. Use of the right-of-way for snow storage by private individuals or companies is prohibited (C.R.S. 43-5-303). The property owner/owners assumes responsibility for the replacement, maintenance, and cleaning of the culvert installed in the driveway approach (See Section 3.3.6.D.2).
3. Road & Bridge may require owners to heat tape their culvert to ensure flow during the winter months to minimize the potential of ice forming on roadways (see Chapter 6 Section 6.8.2).

R. Deviations from the Standards:

1. All new driveway construction commencing after adoption of these standards shall adhere to these driveway standards unless a deviation from the standards is granted in

accordance with Appendix Chapter X of the Clear Creek County International Code Series.

2. Request for deviation from the design driveway standards contained herein must be submitted to the Site Development Department in writing with appropriate justification for consideration for approval.
3. When driveways are granted a deviation to a lesser standard, building construction must meet the criteria set forth by the Wildfire Hazard Mitigation Plan.

4.7.4 Standards for Parking Areas:

A. Parking Index:

The Parking Index standards are specified in the Clear Creek County Zoning Regulations Section 10, Part 1006.1.5.

B. Parking Area Grades:

Parking areas shall have a maximum grade of 4%, and a minimum grade of 1% to facilitate drainage.

C. Surfacing of Parking Areas:

Paving is not required for parking areas and driveways serving single-family units, or for duplexes and Recreational Use Facilities with less than 20 vehicle parking spaces where the road providing access is not paved. Where roads are paved, parking areas for duplexes and recreational areas must be paved.

Unless specifically exempted above, parking areas and drives must be paved with a minimum of six inches of road base compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180 and three inches of pavement; or shall be designed in accordance with Section 2.4.3.C, with TI equaling 6.0.

D. Provision for Drainage in Parking Areas:

Parking area design shall made adequate provision for drainage and prevention of erosion. Drainage from parking areas shall flow to roadside ditches or other approved drainageways. Drainage from parking areas shall not flow onto roadways. Collection points for runoff across parking areas shall be provided to minimize sheet flow.

E. Placement of Parking Areas on Fill:

If a parking area is to be placed on fill, the fill used shall be suitable material as specified by a registered geotechnical engineer. The fill shall be compacted to a minimum of 95% of the maximum dry density at +/- two percent (2%) of optimum moisture content as determined by AASHTO Method T-180 with slopes at no more than 1½:1 (H:V) and protected by rip-rap to prevent erosion from snow storage.

F. Use of Parking Area in Lieu of Meeting Driveway Grades:

In instances where construction of a single family or duplex unit is proposed, and it is not possible to build a driveway to County standards for driveway grades because of the steepness of the lot, a parking area which does meet County standards may be built adjacent to the road which provides access to the lot in lieu of meeting driveway grades. The parking area must be outside the road right-of-way and within 150 feet of the residential structure. The parking area shall be sized so, whenever possible, vehicles can be maneuvered within the parking area so they will not be backed onto the road when exiting. The minimum size for parking areas shall be 400 square feet for each unit served. Parking areas shall not be designed so vehicles are parked end-to-end or parallel to the road, but must allow for cars to be parked side-by-side.

G. Snow-Stack Storage:

Snow storage for parking areas shall be provided on the associated private property. Use of the right-of-way for snow storage by private individuals or companies is prohibited (C.R.S. 43-5-301).

H. Parking Dimensions:

Parking space dimensions and parking lot layout are per Figure 17.

4.8 Landscaping and Erosion Control

Whenever roadway or bridge construction results in earth disturbance, revegetation and reforestation is required per the Clear Creek County Best Management Practices Manual. The site plan shall be approved by the Site Development Department and shall be completed during the first planting season after construction. Native or similar horticulture material shall be used. All areas disturbed by construction operations and not otherwise covered by structures or pavement must be seeded and otherwise treated to provide an established stand of vegetation. Cut and fill slopes must be treated to prevent erosion. Areas not disturbed by construction shall be left in their present vegetative state, except that thinning of trees may be required. In no case shall landscaping in the right-of-way or on private property impede the normal maintenance operations of the Road & Bridge Department or the normal flow and operations of traffic. Specific requirements are as follows:

Erosion Control and Environmental Mitigation Efforts for Driveway Construction:

1. The faces of cut and fill slopes shall be prepared and maintained to control against erosion.
2. This control shall consist of effective planting as a permanent control measure.
3. Permanent soil stabilization measures shall be installed within thirty (30) days after final grade is reached. Planting shall occur within the next window of opportunity should construction be completed during winter months.
4. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.
5. Where necessary, check dams, cribbing, riprap, or other devices or methods shall be employed to control erosion and provide safety.
6. Preserve existing trees, shrubs and grasses where possible to prevent erosion.
7. No work may interfere with the flow of storm water.
8. Excavations shall be constructed so they are stable.
9. Storm water runoff shall be discharged from the site in quantities and at velocities not to exceed historic levels.

10. All erosion control devices shall be maintained so that they function as designed.
11. Dust emissions (wind erosion) shall be controlled.
12. Temporary erosion protection shall be installed prior to excavation.
13. All topsoil shall be salvaged and redistributed.
14. Road crossings across water courses designated as "Waters of the United States" must meet the requirements set forth by the Army Corps of Engineers for permitting before a County permit will be issued.

Chapter 5 – Right-of-Way Permit Requirements

5.1 Purpose and Intent

Right-of-Way Permits shall be obtained whenever a developer, contractor, owner, utility company or other individual proposes to install utility lines, culverts or perform any other work within the County right-of-way. Utilities include water, sewer, natural gas, telephone, electrical, television and fiber optic lines. Right-of-way permits are required to assure the method of installation meets the specifications in these regulations, and adequate reconstruction and/or repair of any damage caused to County roads or road right of way. This standard supersedes Resolution 01-50.

5.2 Requirements for Financial Guarantee

A Performance Guarantee is required for Right-of-Way Permits. The Performance Guarantee is to ensure completion of that part of the construction project that will occur in or affect the Right-of-Way, in accordance with approved plans and, including completion of the County’s inspection of the work. The Performance Guarantee also is to ensure that, upon completion, suspension or termination of the project, the road and right-of-way have been restored to their pre-existing conditions or better before the project, or as otherwise required by the permit, and remain in that condition, without damage, through the warranty period set forth in Section 5.2(b). Performance Guarantees will be based on the amounts set forth in the Permit Fee Schedule for that portion of the project that, in the opinion of the Public Works Director, could affect the integrity of the County’s road and right-of-way. If appropriate in the exclusive judgement of the Public Works Director, the Performance Guarantee will be in the amount of the contract price(s) for constructing the project or its equivalent value if the project is self-constructed.

- A. All Performance Guarantees will be (i) in cash, together with an executed Security Agreement, or (ii) by Letter of Credit issued by a bank physically doing business in the State of Colorado, drawable in the State, and in a form acceptable to the County Attorney.
- B. The Performance Guarantee will be released upon completion of a “warranty period” of twelve (12) months after completion of the work on gravel roads and asphalt roads if, at the time, the work has not failed and the permit has been signed off for a final inspection by the Road and Bridge Supervisor or his designee. If the work has failed or is not completed in accordance with approved plans and without damage to the road or right-of-way, and the permit applicant fails to promptly correct the work, the work will be repaired by the County at the permit applicant’s expense. If the Performance Guarantee does not cover the cost of the repair, the permit applicant must pay the balance upon billing, and no further permits will be issued to the permit applicant while a balance is unpaid.
- C. The work will be deemed complete for purposes of starting the warranty period upon final inspection approval by the Road and Bridge Department, and delivery of an acceptable as-built drawing to the Department.
- D. A letter of credit Performance Guarantee will be drawn on if the conditions for its release are not satisfied within ten (10) business days before its expiration, unless prior to that time a replacement letter of credit or extension is delivered to the Road and Bridge Department.
- E. Utility companies with anticipate needing multiple Right-of-Way Permits in the course of a construction season and whose performance of permit obligations in the past as not required

the County to draw on a Performance Guarantee, may elect to submit a Multiple-Permit Performance Guarantee, in a lump sum of a minimum \$5,000, that will be applied to permit applications at a rate specified in the Clear Creek County Road and Bridge Department Fee Schedule for the permitted work. The Road and Bridge Department will notify the permit applicant when the unallocated amount of the lump sum guarantee falls to \$1,000 and permits will not be issued when the lump sum amount has been reduced to less than the amount required for a requested permit activity until the Multiple-Permit Performance Guarantee has been increased (in \$5,000 increments). The County will consider a blanket surety bond for a Multiple-Permit Performance Guarantee if the terms of the bond, the method of demanding performance on the bond and the bonding company are acceptable to the County Attorney.

5.3 Procedures/Requirements for Issuance of Right-of-Way Permits

The following procedures must be followed and requirements met in the review of applications for right-of-way permits.

5.3.1 Submittal Requirements for Right-of-Way Permits:

- A. No permit will be issued before the fees set forth in the Road and Bridge Department Fee Schedule attached hereto and made a part hereof by this reference, have been paid in full, and the Performance Guarantee has been deposited with the County. (See Table 19 for fees).
- B. The permit applicant is responsible for adequate traffic control and traffic safety in accordance with the MUTCD. Permit applicants will submit a traffic control plan which must be approved by the Road and Bridge Department.
- C. The Road and Bridge Supervisor will determine if a utility facility buried less than eighteen (18) inches is an appropriate and consistent use of the right-of-way geometric cross-section. If the Road and Bridge Supervisor determines that it is appropriate for the installation of the proposed utility facilities to be installed less than eighteen (18) inches, then a deviation from standards to the eighteen (18) inch minimum depth may be issued by the BOCC. Any utility buried less than eighteen (18) inches in depth will be noted on “as-built” drawings and verbal notification will be made to the Road and Bridge Department. **Any damage to utility facilities buried less than the eighteen (18) inch minimum depth made during the course of normal maintenance grading operations by the Road and Bridge Department will be repaired at the expense of the utility owner. Utility owners shall have a period of two (2) years after the adoption of these standards to upgrade the buried facilities to a depth greater than eighteen (18) inches at its expense.**
- D. “As-built” drawings are public information. If a permit applicant asserts the information is confidential under the Colorado Open Records Act, and justifies the assertion in writing, the County will take reasonable steps to maintain the confidentiality of the information. In the event of a Colorado Open Records Act request for disclosure, the County will assert the confidentiality based on the justification and inform the permit applicant of the request. The County will not institute or defend any court proceedings with respect to the claim of confidentiality; it is the duty of the permit applicant to assert or defend its claim of confidentiality. It is a condition of all Right-of-Way Permits that the permit applicant indemnify, defend, and hold harmless the County from any action, judgement, and monetary cost of any nature, arising out of its claim of confidentiality or the Colorado Open Records Act request.

- E. Compaction requirements are specified in Chapter 3, Section 3.3.5.D. The permit applicant will provide copies of the engineer’s compaction test results, indicating compliance to these standards, to the Road and Bridge Department prior to requesting a final inspection.
- F. Utilities shall be installed by jacking and boring and only be open trench when absolutely necessary. When an open trench is excavated the requirements of Section 3.3.5 shall apply.
- G. Any work that has begun prior to permit issuance could be penalized the amount of the permit fee except in circumstances described in Section 5.3.4.
- H. Applications for permits shall be made on standard forms provided by the Road and Bridge Department and permits will be issued on official forms. The applicant shall submit completed original forms with appropriate engineering drawings and specifications. **No photocopied applications will be accepted.** The application must also indicate a ticket number issued by Utility Notification Center of Colorado (Colorado 811) verifying that utilities have been located.
- I. Site plans must indicate the following:
 - 1. location of all excavations using dashed lines
 - 2. location of road and road right-of-way
 - 3. location of any driveways
 - 4. existing structures, if any
 - 5. proposed structures including any garages
 - 6. construction schedule
- J. Owners of property or businesses abutting the utility projects shall be advised of permit applications, by the applicant, which may affect their convenience and economic well-being (See Section 3.2).

5.3.2 Action on Right-of-Way Permits:

Applications for permits shall be submitted at least five (5) days prior to planned commencement of construction for minor installations and repairs and five (5) working days prior for major installations and repairs (See Section 5.5.1). Construction cannot commence without permit approval. The Road and Bridge Department is responsible for review of applications for right-of-way permits. Consideration shall be given to how the proposed installation affects County road maintenance and improvement programs. Right-of-way permits for earth disturbance/road work shall not be issued earlier than May 1st of each year and all right-of-way work shall be completed by October 31st of each year. Permits will be issued only for emergency utility repair between these dates and flowable fill may be required for backfill (Table 17).

Approval of a Right-of-Way Permit may be accompanied by any conditions deemed reasonable by the Road and Bridge Department to ensure protection of health, safety, and welfare and compliance with these regulations.

The Right-of-Way Permit must be signed by the Road and Bridge Supervisor or his designee for it to be approved. Whenever a driveway permit is needed in conjunction with right-of-way work, the Right-of-Way Permit shall not be issued until approval is granted for the needed driveway permit.

During the period of October 31st through May 1st of succeeding year, non-emergency permits for utility work required to comply with PUC laws, rules and regulations, will be approved for boring or open trench work only if above ground temporary installation is not suitable and flowable fill shall be the only approved backfill.

5.3.3 Construction Specifications and Schedule for Right-of-Way Work:

All work undertaken to install utilities or culverts within the County road right-of-way shall conform to the requirements contained in these regulations, and to approved plans and specifications. In issuing right-of-way permits, the Road and Bridge Department shall also approve a construction schedule. The approved construction plans, specification and schedule cannot be changed without written consent of the Road and Bridge Supervisor, except in emergency situations as provided in Section 5.3.4.

5.3.4 Emergencies:

Emergency repair is permitted without prior application, but after-the-fact applications shall be submitted immediately after the Road and Bridge office has reopened, and permit procedures will be followed in the same manner used for non-emergency work. Notification shall be given to the Road and Bridge Department and Sheriff Department at the time of the emergency work. Under no circumstances shall any permanent backfill be placed without obtaining a written permit approval from the Road and Bridge Department.

5.3.5 Expiration of Right-of-Way Permits:

Right-of-Way Permits expire when the end of the approved construction schedule is reached, and must be renewed in advance to prevent the County from drawing on the Performance Guarantee posted by the permit applicant.

5.4 Posting of Right-of-Way Permits

Right-of-Way Permits must be posted on the job site so they are easily visible from the roadway.

5.5 Procedures for Road Closures During Right-of-Way Work

Road closures to accommodate right-of-way work are not permitted unless justified on the basis of overall benefit to the general public. Refer to Section 3.2 for specific requirements to road closures. Requests for road closures shall be specified on the permit form submitted by the applicant, and no road closures shall be undertaken unless approved as part of the Right-of-Way Permit issued by the Road and Bridge Department.

5.5.1 Submittal of Plans and Schedule for Closures:

At least five (5) working days prior to actual closure, the permit applicant shall obtain approval from the Road and Bridge Department for a detailed traffic plan. This plan must conform to the Manual of Uniform Traffic Control Devices and the current Colorado Department of Transportation "S" Standards. In addition, at least five working days prior to actual closure, the permit applicant shall verify the schedule and location of road closures.

5.5.2 Notification of Closures:

At least five working days prior to actual closure, the permit applicant shall notify the appropriate fire district, school district, and the County Sheriff's office of the exact location, date and time traffic will be impeded.

5.5.3 Time of Closures; Detours:

Road closures are only permitted between the hours of 9:00 AM and 3:30 PM unless authorized otherwise by the Road and Bridge Department. Where closures of more than one (1) day are approved, a suitable detour must be provided, and must be marked and signed to accommodate night traffic.

5.6 Protection of Public Safety and Convenience

The permit applicant shall at all times conduct right-of-way work to ensure the least possible obstruction and hazard to the traveling public. The permit applicant shall provide for the safety and convenience of the residents along roads where work is being done, and for the protection of persons and property at all times. Adequate warning signs, barricades, lighting, flags and other devices as specified in the Manual on Uniform Traffic Control Devices Part VI and the Colorado Department of Transportation "S" Standards, and as approved by the Road and Bridge Department shall be provided, maintained, and paid for by the permit applicant. Flaggers shall be posted to guide the traveling public where only one traffic lane remains open, or through otherwise unsafe operations. Prior to issuance of the Right-of-Way Permit, a traffic control plan shall be submitted to the Road and Bridge Department for approval.

5.7 Construction Procedures for Right-of-Way Work

The permit applicant shall plan right-of-way work so it does not create safety hazards or maintenance problems, render portions of right of way unusable for future road improvement, or obstruct major floodways.

5.7.1 Compliance with Safety Standards:

The permit applicant's operations shall conform to the applicable requirements established by the Industrial Commission of Colorado and the Federal Occupational Safety and Health Act (OSHA).

5.7.2 Staging of Installations:

Staging of utility installations may be required by the Road and Bridge Department to produce the least disruption possible for the traveling public. A permit for any subsequent stages may not be issued until the prior stage has satisfactorily progressed or been completed.

5.7.3 Installation of Utilities:

All utilities shall be installed in accordance with the plans and specifications approved by the utility owner and the Road and Bridge Supervisor. Where applicable, the plans for installation must bear the name, seal and signature of a Colorado licensed Professional Engineer responsible for their preparation. The alignment of all utilities within County rights-of-way is subject to approval by the County Road and Bridge Supervisor and/or the BOCC. See Table 18 for utility installation depths.

A. Underground Utilities:

All accesses to underground utilities from the road surface (e.g. manholes, vaults) shall be of heavy-duty construction capable of safely supporting anticipated maintenance equipment and vehicular traffic. The level of these accesses shall conform to the finished grade of the road (See Section 3.3.8.C and 3.3.9.D). Seep plugs shall be installed in trenches used for underground utilities at no less than 500-foot intervals if the possibility exists that the surrounding water will

be lowered and this will have an adverse effect on surrounding wells and vegetation dependent on the water table elevation.

B. Aboveground Utilities:

All aboveground utilities shall be located and installed so it does not cause unnecessary obstruction to pedestrian and vehicular traffic or damage to the utility itself that could be harmful to the general public. The minimum overhead clearance shall be 18 feet. No pole or structure above ground shall be placed within a pedestrian walkway nor set closer than ten (10) feet to the shoulder of any County road (see Section 2.7.4). In no case will a pole be permitted within ten feet of the travel lane shoulder of a County road except light and traffic control poles with breakaway bases.

C. Utilities in Major Floodways:

All utilities within or adjacent to major floodways shall comply with the Clear Creek County Floodplain Regulations, and shall be located and installed in a manner that will prevent objectionable damage such as land erosion, water pollution or flood diversions.

5.7.4 Trenching, Backfill and Reconstruction of Road Surfaces:

The method used in trenching for underground utilities and for backfilling trenches shall comply with the requirements of these regulations (Section 3.3.5). Jetting of backfill is not permitted within County roadways. Upon completion of installation, the roadway shall be reconstructed using the specifications contained in these regulations for subbase preparation, base course materials, thickness and compactions, and final surfacing so as to restore the roadway to current construction standards for that type of road.

A. Gravel Roads:

Suitable material excavated from trenches may be used for backfill subject to approval of the Road and Bridge Department. At no time shall contaminated, wet, soggy, frozen or other unsuitable material be used as backfill. If proper backfill is not available at the site, suitable material shall be imported and unsuitable material removed from the site. Backfill shall extend to the subgrade of the road or to natural ground (see Figure 18).

B. Paved Roads:

All cuts made in asphalt or concrete surfacing shall be made by mechanically cutting a horizontal and vertical line and shall be cut one foot wider than the edges of the trench or the damaged area, the final pavement cut shall not be made until immediately prior to patching. All excavations made in paved streets shall be completely restored within thirty (30) days after acceptance of the backfill by the Road and Bridge Department. In the event weather conditions preclude restoration by permanent hot bituminous pavement, temporary repairs may be tamping and rolling into place a cold mix asphalt. Such cold mix patches shall be removed and replaced by a permanent hot bituminous pavement within thirty (30) days or as weather and availability of materials permit. Permanent hot mix patches shall be no less than three (3) inches in thickness or not less than the thickness of the pavement adjacent to the excavation,

whichever is thicker. Permanent patches shall be installed in accordance with the Road and Bridge Standards.

Damaged pavement shall be repaired by appropriate methods as approved by the Road and Bridge Department. In general, cracks shall be filled with the proper asphalt hot bituminous pavement product and the surface seal-coated. An overlay, the full width of the paved surface, shall be required in those instances where, in the opinion of the Road and Bridge Supervisor, riding quality, safety or appearance of the finished roadway has been impaired. Subgrade failures caused by the permit applicant's operation of heavy equipment shall be rectified by reconstructing the subgrade layers and replacing the subbase, base and paving.

5.8 Inspection and Testing of Right-of-Way Work

Adequate inspections ensure compliance with County requirements and are the basis for release of maintenance responsibility and/or for release of the Performance Guarantee. It is the responsibility of the permit applicant to contact the Road and Bridge Department two (2) working days in advance of required inspections. In-progress inspections of all elements of work will eliminate the need for extensive post testing. At least one inspection at the conclusion of right-of-way work is required. In making this inspection, the Road and Bridge Department shall check for compliance with these regulations and approved plans, and also for adequate cleanup of roadway surfaces and the right-of-way.

Any work or material which does not conform to these regulations, any pavement failures or broken asphalt, damaged signs or fencing, any remaining debris either in the roadway or adjacent property, or improper drainage, shall be brought to the attention of the permit applicant both verbally and in writing. Any work in which untested or unaccepted materials are used shall be ordered removed and replaced at the permit applicant's expense. If immediate corrections are not made, further project construction shall be stopped.

In determining whether or not right-of-way work done by the permit applicant complies with these regulations, the Road and Bridge Department may consult with an engineer at the permit applicant's expense. If it is decided testing is required to ascertain compliance, the most recent standard methods of AASHTO or ASTM shall be used and conducted by an independent testing firm at the permit applicant's expense. If the permit applicant maintains his own testing equipment and qualified personnel, the requirement for an independent testing firm may be waived by the Road and Bridge Supervisor. Copies of test data shall be furnished to the Road and Bridge Department in a timely manner.

5.9 Responsibility for Corrective Work Upon Completion of Right-of-Way Work

The permit applicant shall be fully responsible for the maintenance and correction of any faulty construction, including unstable road cuts and potholes developed during the construction period. The roadway and roadside areas where utility work has been performed shall be thoroughly cleared of all debris and extraneous material and shall be resolved to the satisfaction of the Road and Bridge Department. Failure to do so could be cause for denial of future right-of-way permits or a draw on the permit applicant's Performance Guarantee.

5.10 Guarantee Period for Right-of-Way Work

The permit applicant shall be responsible for a period of one (1) year after completion of right-of-way work for any maintenance or repair necessary to keep the roadway in an acceptable condition. The County shall retain the permit applicant's Performance Guarantee for the entire warranty period to ensure any required corrective work is done. The permit applicant may apply in writing to the Road and Bridge Supervisor for release of a portion of the Performance Guarantee.

5.11 Changes Affecting Utilities

Future changes to County roads may require the relocation or removal of utility installations. For minor changes the affected utility company shall complete the relocation or removal within sixty (60) days after notification by the Road and Bridge Department. For major utility relocation projects involving extensive design, securing of contracts or material orders, the affected utility company shall complete the relocation or removal within ninety (90) days of approval from the Road and Bridge Department for the final design. To avoid the necessity for such changes, utility companies are encouraged to locate their facilities consistent with future plans for County roadways. In all events, utility relocations will be performed at no cost to the County.

Chapter 6 – Road Acceptance and Maintenance

6.1 Purpose and Intent

The purpose of this section is to outline the County’s policy regarding road maintenance, including responsibilities of property owners. The major components of the maintenance program are: snowplowing and sanding, asphalt patching, overlays and replacement, grading of gravel roads, and maintenance of drainage ways.

In order for maintenance to be done on an efficient basis, roads must be constructed to certain standards of geometric alignment, materials quality and construction quality as described in these regulations.

Before the County will maintain roads built by developers or owned and maintained by private property owners, they must petition the BOCC to accept the roads for maintenance. A minimum of one (1) year will elapse between the time the petition is reviewed and if approved probationary maintenance can begin. This period of time is due to the budget process time needed to insure funds are available to maintain the road. This section outlines the acceptance procedure and the conditions that must be met for approval. This standard supersedes Resolution 98-171.

6.2 Maintenance Classifications

The County classifies roads into different categories to describe the type of maintenance they receive. These categories include:

6.2.1 Full:

This category includes roads where the right-of-way has been dedicated to the County, the road meets County design and construction standards, the BOCC has accepted the right-of-way dedication, and the road has passed any required probationary periods (see Section 6.2.2). It also includes roads which may or may not meet current County design and construction standards, but which were dedicated to and accepted by the County for full maintenance before road standards were adopted or enforced. Full maintenance status assigns complete responsibility to the Road and Bridge Department for snowplowing, grading, resurfacing, ditch maintenance and repair as necessary. For snowplowing, priorities are assigned which reflect the use of the road and its relative importance to traffic flow.

6.2.2 Probationary:

When roads are dedicated to the County as public roads, the BOCC may consider probationary maintenance for a two-year probationary period provided the roads meet the requirements outlined in Section 6.3. During this period, any repairs are the responsibility of the property owners or developer seeking final acceptance from the County. The procedures for converting a road from probationary to final acceptance are stated in Section 6.5.

6.2.3 Provisional:

This category includes roads which do not meet current County standards with respect to widths, curves, or grades, but which were dedicated to and accepted by the County prior to road standards being adopted or enforced. Such roads may receive limited summer maintenance, but no winter

maintenance because snow removal equipment is unable to maneuver on them. This maintenance level is low priority and is dependent on the availability of funds, manpower and equipment.

6.2.4 No Maintenance:

This category includes any and all public or private roads which are not maintained by the County under any circumstances.

6.3 Assumption of Road Maintenance

When Clear Creek County is petitioned to assume maintenance of a road or roads in the unincorporated portion of the County, Clear Creek County (as outlined in Sections 6.5 through 6.7) shall take into consideration the following criteria when determining if the road or roads should receive county road maintenance:

1. The revenues received and the costs incurred to maintain the road.
2. The current and projected build-out in the development.
3. The overall goals, objectives, and budgetary considerations of Clear Creek County in providing safe and efficient maintenance to a majority of the citizens.

The County shall review each road individually within a development to determine if that road should receive County maintenance.

6.4 Provisions for Private Maintenance

Whenever a developer proposes private maintenance of roads within a development, it shall either form an organization of property owners or annex the development to an existing organization which will assume financial responsibility for road maintenance. They shall also require through covenants or deed restrictions that all property owners within their development join this organization and assume their share of its financial obligations. Where a new organization must be formed because no existing organization is in close proximity, the developer shall form a metropolitan district, special district, homeowners association or other appropriate organization approved by the County for this purpose.

6.5 Acceptance of Private Right-of-Way for Road Maintenance

For existing subdivisions and developments with private rights-of-way, the following procedure shall be used for consideration by the County to accept these types of roads for maintenance.

6.5.1 Filing Request for County Acceptance:

The property owners holding title to the roads must submit a letter to the Site Development Department requesting the BOCC accept maintenance responsibility for the roads. The letter should describe the road or roads, the length to be considered and must be signed by all people having an ownership interest in the road, or by the board of the homeowners association if their covenants allow the board to act for the owners. The processing fee must accompany the petition request prior to evaluation.

6.5.2 Staff Evaluation and Recommendation:

The County Site Development Inspector shall inspect the roads to determine whether or not they meet the County's criteria and design and construction standards in these regulations. It is the County's policy

to accept only those roads which meet these requirements. If a road does not meet County standards, the property owners are responsible for improving the road to County standards prior to requesting acceptance. One method for accomplishing these improvements is the formation of a local improvement district (see Section 6.7). Staff will provide a recommendation as to whether or not the road is acceptable for probationary maintenance. This recommendation will be forwarded to the BOCC. If probationary status is granted, after the two-year probationary period, staff shall make a final recommendation on whether or not full maintenance should be granted. This recommendation shall be forwarded to the BOCC as an Action Item during a regularly scheduled BOCC meeting.

If site conditions are so limiting that they make it impractical or impossible to bring existing road conditions up to these standards the petitioners will present written argument to the BOCC as to why the road should be excepted from the recommended standard and how safety issues will be mitigated. The Road and Bridge Supervisor and/or the Site Development Department will provide written comment to the BOCC as to the reasonableness of the request, any potential impacts that the exception might create for the County and a recommendation.

6.5.3 BOCC Action on Request:

After the BOCC has received the recommendation from the Site Development Department concerning acceptance of roads for probationary maintenance, they shall take action by resolution to either grant or deny probationary acceptance of the road.

6.5.4 Final Acceptance:

After the two-year probationary period, staff shall make a final determination as to whether or not the road should receive full maintenance and forward the recommendation to the BOCC as an Action Item during a regularly scheduled BOCC meeting.

6.6 Acceptance Procedure for Road Constructed by Developers and Proposed for Acceptance by the County

The County Subdivision Regulations require developers to construct roads necessary to serve approved subdivisions. The following procedure shall be used to determine whether or not the county will accept roads built by developers for maintenance.

6.6.1 Design Review:

The developer must obtain approval for the road design from the Road and Bridge Supervisor prior to construction of any road regulated hereunder. The Road and Bridge Supervisor shall determine the road classification, compliance with design criteria and construction standards in these regulations, and adequacy or right-of-way prior to granting approval of the road design.

6.6.2 Inspections:

At appropriate intervals during construction of the road, the developer's engineer shall request inspection by the Road & Bridge Department. In order for the road to be considered for probationary maintenance, inspections must occur at the completion of each of the following steps:

1. rough grading
2. sub-grade preparation

3. placement of road base
4. paving (if applicable)
5. construction of drainage improvements including culverts for driveways, (if applicable)
6. placement of signs (if applicable)

A final inspection shall be conducted after the completion of all improvements. The final inspection shall occur between May 1st and October 31st. Roads must comply with the design criteria and construction standards in these regulations, and with any approved plans. If the inspection discloses any work, in whole or in part, as unsatisfactory, the Road and Bridge Supervisor shall follow the procedure stated in Section 3.3.2.

6.6.3 Filing Request for County Acceptance:

Developers seeking County acceptance for maintenance of roads must submit a letter to the Site Development Department requesting the BOCC's approval.

6.6.4 Staff Evaluation and Recommendation:

The Site Development Inspector shall determine if the road meets the requirements of these regulations. A recommendation on whether or not probationary maintenance should be provided shall be forwarded to the BOCC as an Action Item at a regularly scheduled BOCC meeting. It is the County's policy to accept roads for maintenance only if they meet the requirements of these regulations and have received design approval and inspection during construction.

6.6.5 BOCC Action on Request for Acceptance:

After the BOCC have received the recommendation from the Site Development Department they shall take action by resolution to either grant or deny probationary maintenance of the road.

6.6.6 Guarantee Period After Probationary Acceptance:

Under probationary acceptance, the developer is responsible for making repairs and correcting failures for a period of two years from the date probationary acceptance is granted. During this two-year period, the County will plow those sections of road necessary to serve units which have been built.

6.6.7 Final Acceptance:

No earlier than twenty months after the BOCC grant probationary acceptance, the developer may request re-inspecting, noting any defects or required repairs. The developer shall correct the defects or required repairs. After any defects have been cured and repairs made and 24 months have elapsed since probationary acceptance was granted, the developer may submit a letter to the Site Development Department requesting final acceptance of the road. The staff shall make a final determination as to whether or not the road should receive full maintenance and forward the recommendation to the BOCC as an Action Item at a regularly scheduled BOCC meeting.

6.7 Acceptance Procedure for Roads Constructed Through Local Improvement Districts

One of the mechanisms available for upgrading existing private or public roads to County standards is the formation of a local improvement district. Under a local improvement district, the County issues tax-

exempt bonds to pay for the improvements. Such improvements may include: adjusting road grades, widths and alignments, improving drainage, adding road base and/or paving. The cost is assessed against the lot owners who benefit from the improvements.

6.7.1 Design and Construction Standards for Local Improvement Districts:

Roads constructed through an improvement district shall meet County standards unless a specific deviation from standards is approved by the BOCC. Approved deviation from standards shall be documented by a resolution of the BOCC adopted at the same time as the district is formed.

6.7.2 Construction Supervision for Local Improvement Districts:

During construction, the Road and Bridge Department shall be responsible for inspecting work done by the contractor, or shall hire a consultant for this purpose, to make sure the design and construction specifications are met. At the end of construction, the Road and Bridge Supervisor shall conduct a walk-through of the project to make sure work has been completed as expected.

6.7.3 Staff Evaluation and Recommendations:

The County Road and Bridge Supervisor will make a recommendation based upon the criteria set forth in Section 6.3.

6.7.4 BOCC Action on Request for Acceptance:

After the BOCC have received the recommendation from the Site Development Department, they shall take action to either grant or deny full maintenance of the road. The fact that the upgrading of the road was accomplished through a local improvement district does not guarantee acceptance. In addition, acceptance shall only be considered if the property owners dedicate the necessary right-of-way to the County, the road meets the design and construction standards in these regulations except for approved deviation from standards, and maintenance is feasible. If acceptance for full maintenance is granted, any approved deviation from standards shall be documented in the resolution of approval. Full maintenance means the County assumes ongoing responsibility for maintenance and plowing.

6.8 Responsibilities for Road Maintenance

Private individuals, including property owners, developers, contractors and others carry certain responsibilities in the maintenance of County roads.

6.8.1 Providing for Parking:

Parking on County roads is regulated in Clear Creek County by Ordinance 5 and the County's Zoning Regulations, and it is the responsibility of every property owner to provide adequate off right-of-way parking. On-street parking presents particular difficulties during snow plowing season and the Sheriff's Department may order illegally parked vehicles to be towed. In addition, the Road and Bridge Supervisor may, at their discretion, decline to plow all or portions of a road if one or more cars are parked so as to impede plowing.

6.8.2 Providing for Drainage:

Culverts are required where driveways connect to roadways unless specifically exempted by the: Site Development Inspector, Road and Bridge Department and these regulations. It is the responsibility of

the property owner to maintain their culverts free and clear of silt, mud, debris and ice during times that flow occurs in the ditch. Damage to a road caused by a blocked culvert or lack of a culvert is the responsibility of the property owner. If it becomes necessary for the County to undertake repairs, costs will be billed to the property owner by the Road and Bridge Department as authorized by Colorado Statutes (C.R.S. 43-5-303).

Water which flows out of driveways must be diverted to ditches. Damage to roadways caused by such water is similarly the responsibility of the owner and repair costs will be billed.

6.8.3 Keeping Right-of-Way Clear:

Storage of material in any road right-of-way is prohibited. Any material which is stored in the road right-of-way which impedes snow plowing or road maintenance, or which constitutes a hazard to the general public, will be removed by the Road and Bridge Department and the owner billed for the cost as authorized by Colorado Statute (C.R.S. 43-5-301).

6.8.4 Repairing Damage:

Whenever a property owner, developer, contractor, or any other individual undertake an activity which damages a County road or road right-of-way, they are responsible for restoring the road to, at least, its original condition. This requirement applies especially to damage caused by construction activities adjacent to a County road. Ultimate responsibility for assuring adequate restoration is accomplished lies with the owner of the property where construction is occurring.

Chapter 7 – Reserved

Chapter 8 – Enforcement of Design and Construction Standards

8.1 Failure to Comply

Failure to comply with any portion of these design and construction standards and permit procedures shall be sufficient grounds for denial, suspension, or revocation of any necessary permit. Financial penalties may also be imposed. These regulations may be enforced by actions filed on behalf of the Board of County Commissioners for abatement or injunction, or to recover damages resulting to County rights-of-way due to noncompliance with these regulations.

8.2 Effective Date of Design and Construction Standards

Any roads or bridges proposed as part of a subdivision submitted for final plat review after final approval of these regulations shall conform to the requirements of these regulations. Any roads or bridges within an approved subdivision where either the preliminary plat or final plat expires, or is proposed for reapproval or replatting after final approval of these regulations shall conform to these regulations.

Roads or bridges which have been approved as part of a subdivision or site plan prior to final approval of these regulations, and where construction is commenced prior to expiration of the final plat or site plan may be built in accordance with the design and specifications approved in conjunction with the plat or site plan.

Table 1 – Design Capacities for Classes of Roadways

Classification	ADT
Principal Arterial	5,000 - 10,000
Arterial	3,500 - 5,000
Collector	2,000 - 3,500
Local Access	500 - 2,000
Low Volume	100 - 500
Primitive	Less than 100

Table 2 – Per Unit Average Daily Traffic

Type	Unit	Per Unit ADT
Residential Density	per dwelling unit	10.0
Condominium	per dwelling unit	7.0
Mobile Home Park	per mobile home	7.0
Hotel	per room	10.5
Restaurant	per 1000 S.F. gross	164.0
Commercial	per 1000 S.F. gross	115.0
Office	per 1000 S.F. gross	12.3
Campground	per space	6.6
RV Park	per space	6.6
Super Market	per 1000 S.F. gross	125.0

Table 3 – Summary of Road Design Elements

Summary of Road Design Elements					
Design Element	Arterial	Collector	Local Access	Low Volume	Primitive
Right of Way (min)	100	80	60	50	40
Recommended Design Speed	40 - 60	35 - 45	25 - 35	20 - 35	20 - 30
Number of Lanes	2 - 4	2	2	2	1 - 2
Lane Width(ft)	12	12	11	10	10 - 12 (1)
Shoulders (ft)	6	4	2	2	2
Maximum Sustained Grade %	6%	6% (2)	6% (2)	8%	10%
Bridge Width	Same as Roadway	32	26	24	Same as Roadway
Design Capacity	5000	3500	2000	500	100
(1) For roads having one lane, lane must be 12' ; for roads having two lanes, each lane must be 10'					
(2) See Section 2.43.A.2 for exceptions					

Table 4 – Stopping and Passing Sight Distance

Design Speed	Stopping	Passing
	Sight Distance	Sight Distance
15	100	500
20	150	700
25	200	900
30	250	1100
35	300	1300
40	400	1500
45	500	1650
50	600	1800
55	700	1950

Table 5 – Minimum Radius of Curvature

Design Speed	Minimum	Minimum
	Curvature Radius	Tangent Lengths
15	75	50
20	125	75
25	175	100
30	250	150
35	375	200
40	550	250
45	700	250
50	850	250
55	1200	250

Table 6 – Crown Slopes

Type of Surface	Crown Slope %
Pavement	2.0
Gravel	3.0

Table 7 – Design Chart for Superelevation and Superelevation Run-Off

Design Chart for Superelevation and Superelevation Run-off										
Degree of Curve	20 MPH		30 MPH		40 MPH		50 MPH		60 MPH	
	e	L	e	L	e	L	e	L	e	L
1	NC	0	NC	0	NC	0	RC	0	.029	175
2	NC	0	RC	0	.021	125	.038	150	.051	175
3	NC	0	.025	100	.038	125	.053	150	.068	180
4	RC	50	.031	100	.047	125	.063	150	.078	210
5	.021	50	.038	100	.055	125	.071	170		
6	.025	50	.043	100	.062	130	.077	180	Dmax=4 45'	
7	.028	50	.048	100	.067	140	.080	190		
8	.031	50	.053	100	.071	150				
9	.035	50	.056	100	.075	160	Dmax=7 30'			
10	.037	60	.060	110	.078	160				
12	.043	60	.065	120	.080	170				
14	.047	70	.070	130						
16	.051	70	.074	130	Dmax=12 15'					
18	.054	80	.077	140						
20	.057	90	.079	140						
22	.060	90	.080	140						
24	.062	100								
28	.067	100	Dmax=22 45'							
32	.070	110								
36	.074	110								
40	.076	120								
44	.078	120								
48	.079	120								
52	.080	120								
Dmax = 53 30'										
D = Degree of Curve and D = 5730/R										
e = rate of superelevation										
L = minimum length of runoff										
Source: A Policy on Geometric Design of Highways and Streets, 2001; pp 147 - 166										

Table 8 – Minimum Traffic Indexes

Road Class	Minimum TI
Primitive	3.5
Low Volume	4.5
Local Access	5.0
Collector;	
Residential	6.0
Commercial	7.0
Industrial	8.5
Arterial	10.0

Table 9 – Minimum Structural Sections

Road Class	Gravel	Paved*			
Primitive	3" Base Course	3" Asphalt			
	3" Subbase	3" Base Course			
		3" Subbase			
Low Volume	3" Base Course	3" Asphalt			
	3" Subbase	3" Base Course			
		3" Subbase			
Local Access	4" Base Course	3" Asphalt			
	4" Subbase	3" Base Course			
		3" Subbase			
Collector	Not Applicable	4" Asphalt			
		4" Base Course			
		4" Subbase			
Arterial	Not Applicable	6" Asphalt			
		4" Base Course			
		4" Subbase			
* Full depth asphalt or concrete designs will be considered and may be used with the approval of the County Road and Bridge Supervisor.					

Table 10 – Coefficient of Runoff

Type of Surface	Value of C =		
		Rainfall	
Roofs		0.97	
Pavements	Concrete or Asphalt	0.97	
	Gravel, from clean and loose to clayey and compact	0.60	
Earth Surfaces	Sand, from uniform grain size, no fines to well graded, some clay or silt	Bare Light Vegetation Dense Vegetation	0.60 0.45 0.35
	Clay, from course sandy or silty, to pure colloidal clay	Bare Light Vegetation Dense Vegetation	0.70 0.50 0.40

Table 11 – Maximum Permissible Velocities

Channel Material	“n”	Velocity (ft/sec)
Lined or well established grass	0.05	5
Bunched grasses with exposed soil	0.04	3
Fine sand or silt	0.02	1
All other bare soils	0.03	2

Table 12 – Driveway Widths

Driveway Widths				
Type of Service	Minimum Driveway Driving Surface Width	Opening Width (including flares)		Minimum Centerline Radius of Curvature
		Minimum	Maximum	
Commercial	22 feet	24 feet	*	65 feet
Residential				
Single Family:				
<200' in length	12 feet	18 feet	24 feet	40 feet
>200' in length	14 feet	18 feet	24 feet	40 feet
Serving two to five units:				
<200' in length	14 feet	20 feet	24 feet	40 feet
>200' in length	16 feet	20 feet	24 feet	40 feet
Multi-Family	22 feet	24 feet	30 feet	65 feet
	Turnout Spacing for Driveways			
	Length	Turnouts		
	< 400 feet	None		
	400 – 800 feet	One turnout at midway point of driveway		
	> 800 feet	Every 400 feet		

*To be determined at time of site plan review.

Table 13 – Gradation of Gravel Roads

Standard Sieve Size	% Passing by Weight
Subbase Course:	
1-1/2"	100%
1"	95 - 100%
No. 4	30 - 70%
No. 200	5 - 12%
Base Course:	
3/4"	100%
No. 4	30 - 60%
No. 8	25 - 55%
No. 200	5 - 12%

Table 14 – Gradations for Base Course Material

Standard Sieve Size	CDOT Class 5	CDOT Class 6
	% Passing	% Passing
1-1/2"	100%	--
1"	95 - 100%	--
3/4"	--	100%
No. 4	30 - 70%	30 - 65%
No. 8	--	25 - 55%
No. 200	3 - 15%	3 - 12%

Table 15 – Crushed Gravel Aggregate for Asphaltic Concrete - CDOT Class E

Gravel Sieve Size	% Passing by Weight
3/4"	100%
No. 4	44%
No. 8	30%
No. 200	3 - 12%

Table 16 – Placement Temperature Limitations for Asphalt Pavement

		Min. Placement Air Temp.	
Compacted Thickness		Mix Temp. 260 degrees ± 25	
Top Layer of Completed Pavement:			
1-1/2" to 2-1/2"		50 degrees F.	
More than 2-1/2"		40 degrees F.	
Layers Below the Top Layer of Compacted Pavement:			
1-1/2" to 2"		40 degrees F.	
2" to 3"		30 degrees F.	
3-1/4" to 4"		25 degrees F.	
More than 4"		20 degrees F.	

Table 17 – Flowable Fill

CDOT Mix	Onsite Mix
4% cement	6% cement
10% flyash	94% fine onsite material
86% sand	28 oz water / lb mix
25 oz water / lb mix	

Table 18 – Utility Facility Required Installation Depths

Cable TV	2 ft. or 1 ft. below culvert
Telephone Cable	2 ft. or 1 ft. below culvert
Fiber	2 ft. or 1 ft. below culvert
Communication Conduit	4 ft. or 2 ft. below culvert
Power Cable	
(w or w/o conduit)	4 ft. or 2 ft. below culvert
Gas Distribution Line	5 ft. or 3 ft. below culvert
Gas Main Lines	6 ft. or 4 ft. below culvert
Water / Sewer Main	10 ft. or 6 ft. below culvert
Water / Sewer Line	8 ft. or 5 ft. below culverts

Table 19 – Permit and Evaluation Fees

Road and Bridge Department Permit and Evaluation Fee Schedule <i>Effective April 27, 2021</i>	
Right-of-Way Permit Fee	
	\$340.00
	Plus \$25 per additional 1,000 square feet of disturbance or 100 linear feet of open trench
Performance Guarantees	
Area to be based on proposed or actual disturbance to include all disturbance areas, i.e. soil stockpile, trenches, etc.	
Gravel Road	\$500.00
	Plus \$500 per additional 1,000 square feet of disturbance or 100 linear feet of open trench
Asphalt Road	\$1,000.00
	Plus \$1,000 per additional 1,000 square feet of disturbance or 100 linear feet of open trench
Other Fees	
Plan review required by changes, additions or revisions to approved plans	\$90.00 per hour Minimum charge - 1/2 hour
Request for deviation from road design standards	\$600.00
Additional Inspection Fees	
Inspection for which no fee is specifically indicated	\$75.00 per hour Minimum charge - 2 hours
Reinspection fee	\$75.00 per hour

Figure 1 – Typical Cross Section for a Four Lane Arterial Road

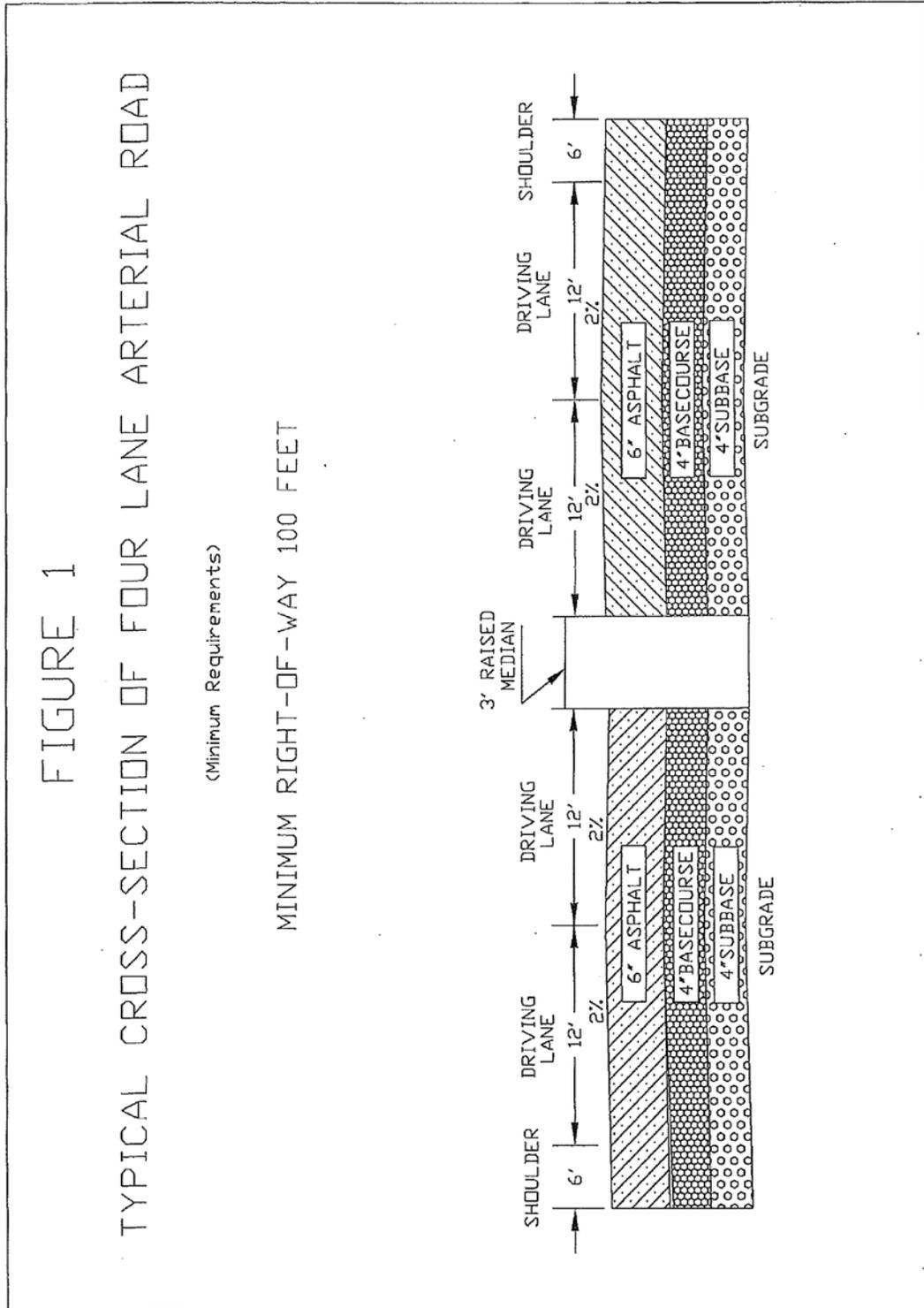


Figure 2 – Typical Cross Section for a Two Lane Arterial Road

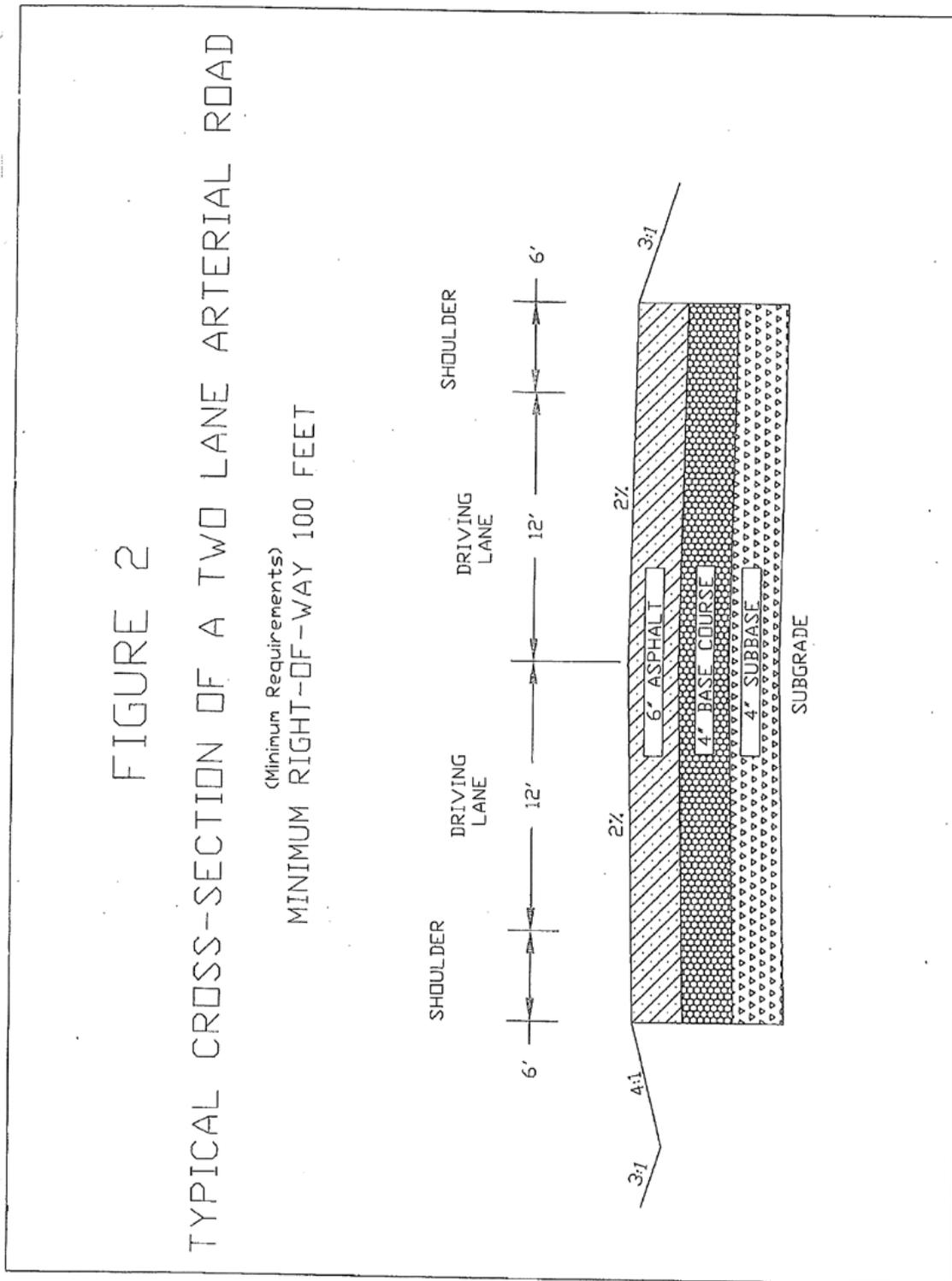


Figure 3 – Typical Cross Section for a Collector Road

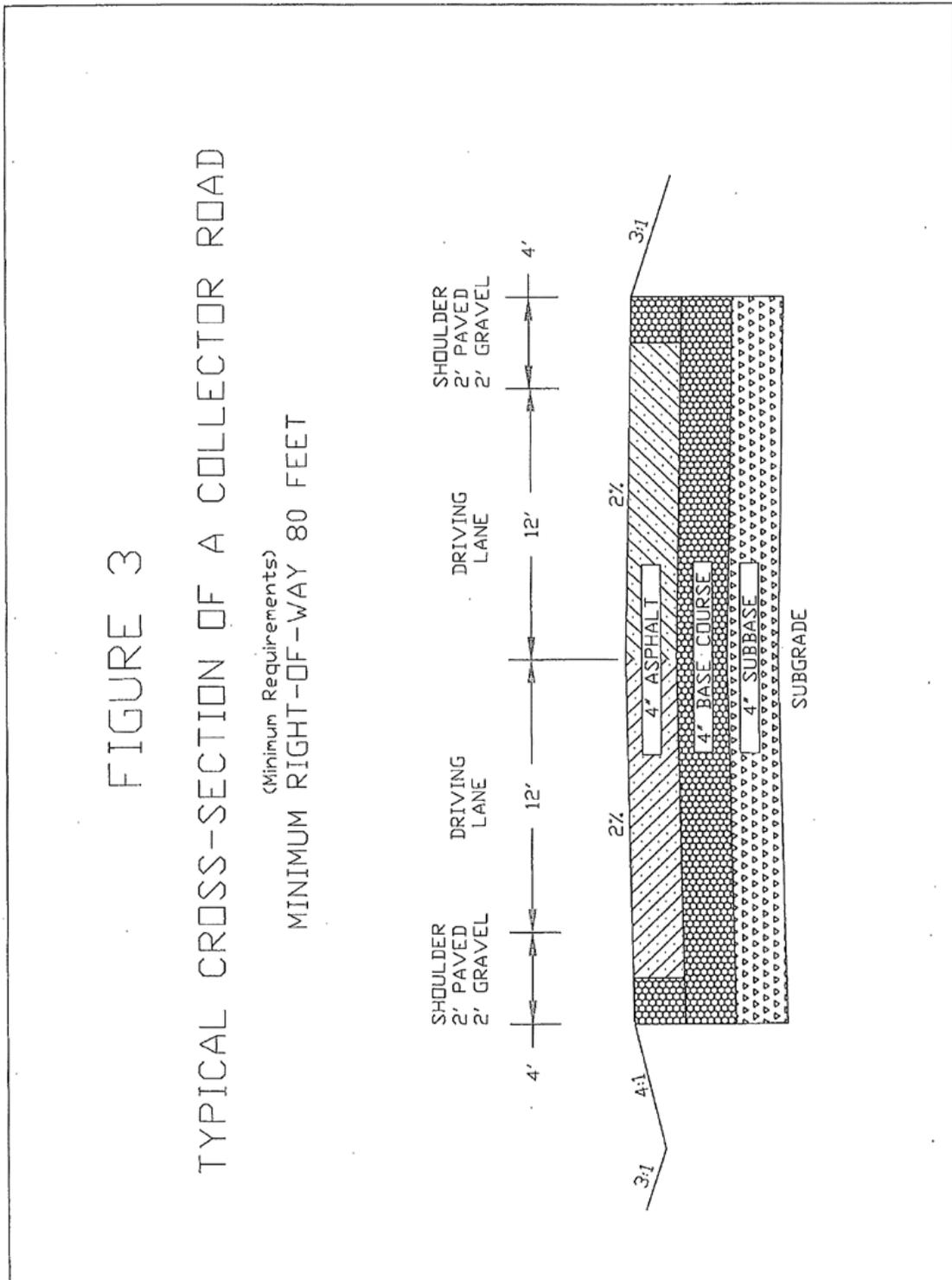


Figure 4 – Typical Cross Section for a Local Access Road

Figure 5 – Typical Cross Section for a Low Volume Status Road

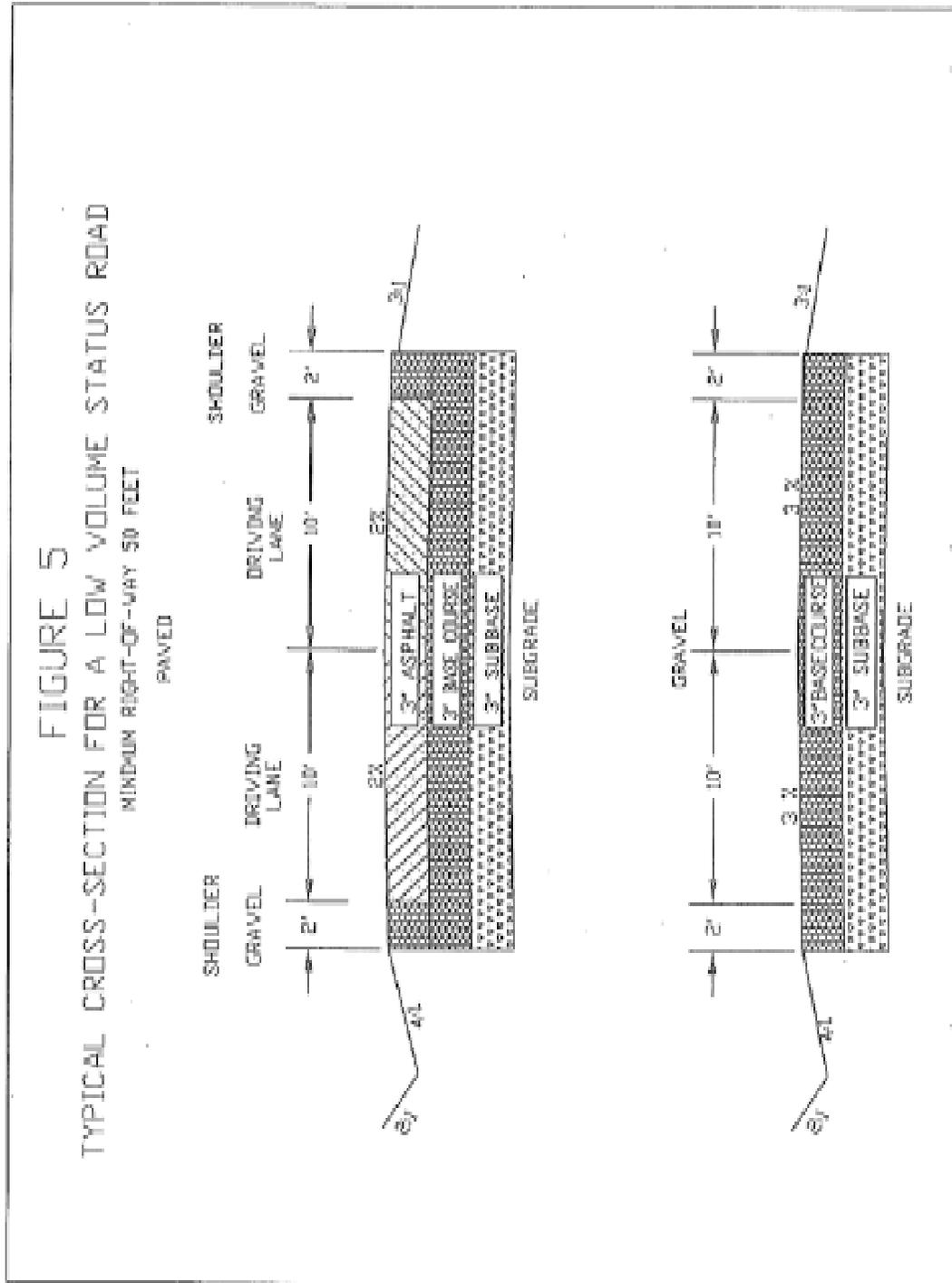


Figure 6 – Typical Cross Section for a Primitive Status Road

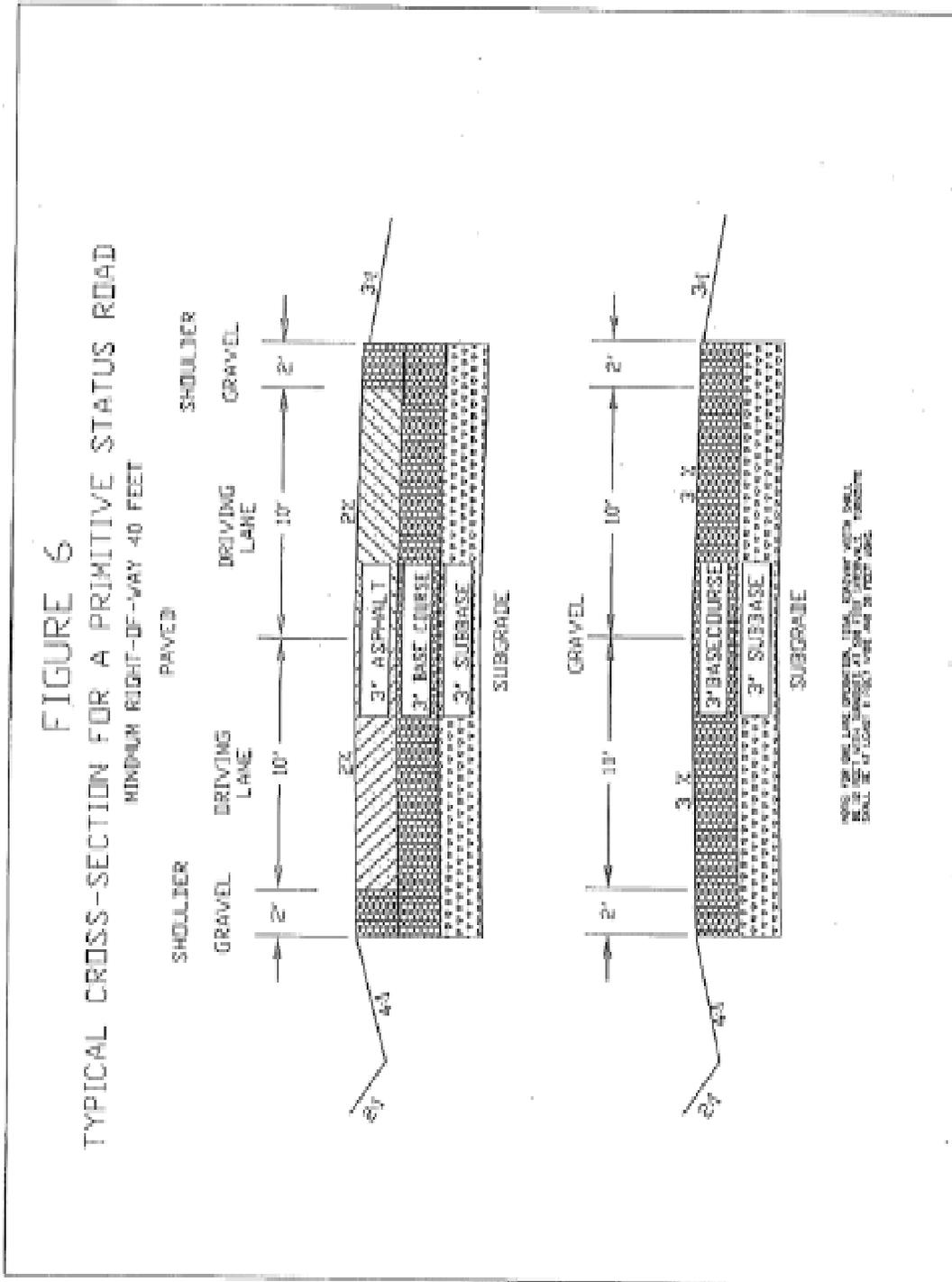


Figure 7 – Hammerhead and Cul-De-Sac Designs

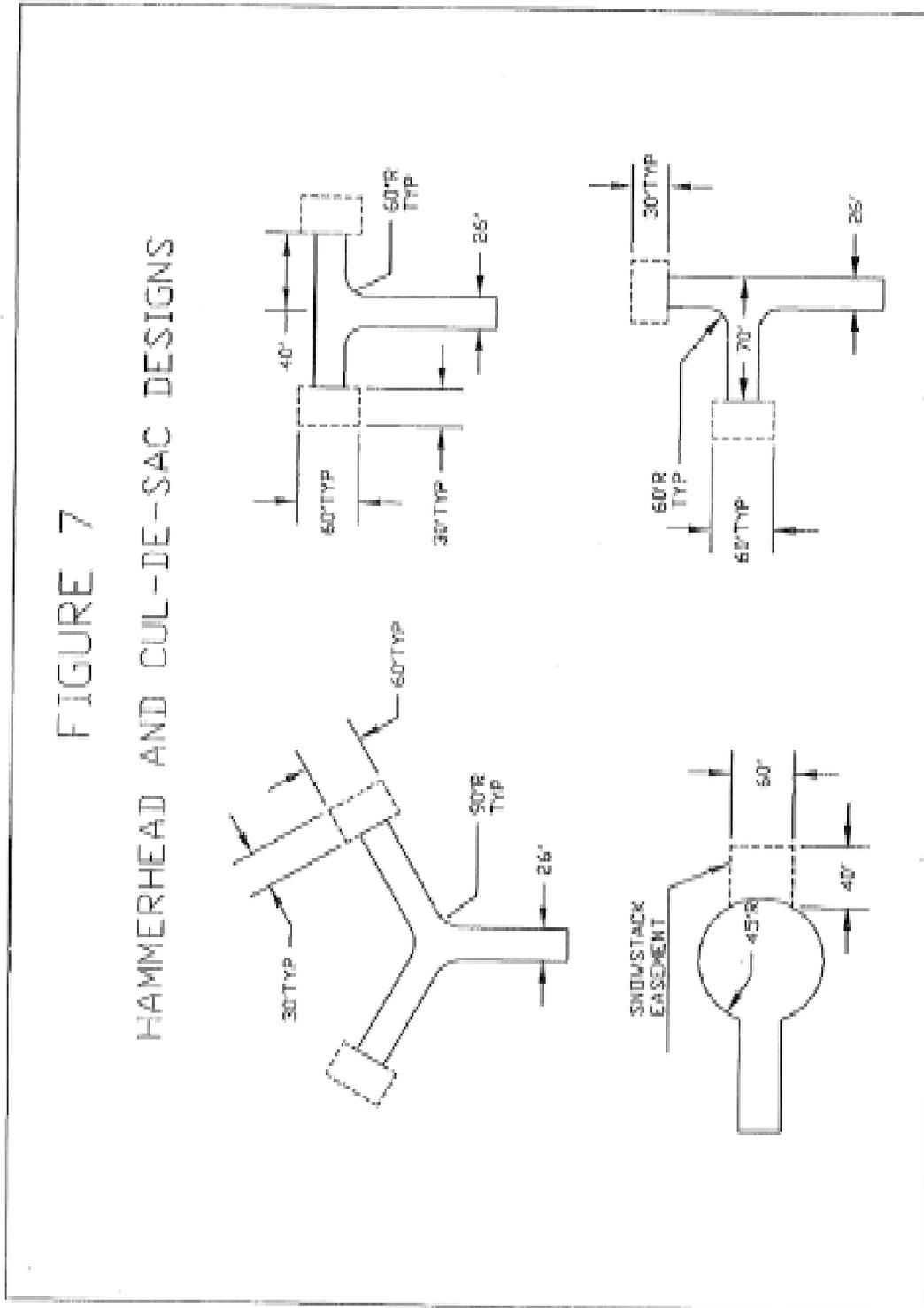


Figure 8 – Sight Distance Triangle

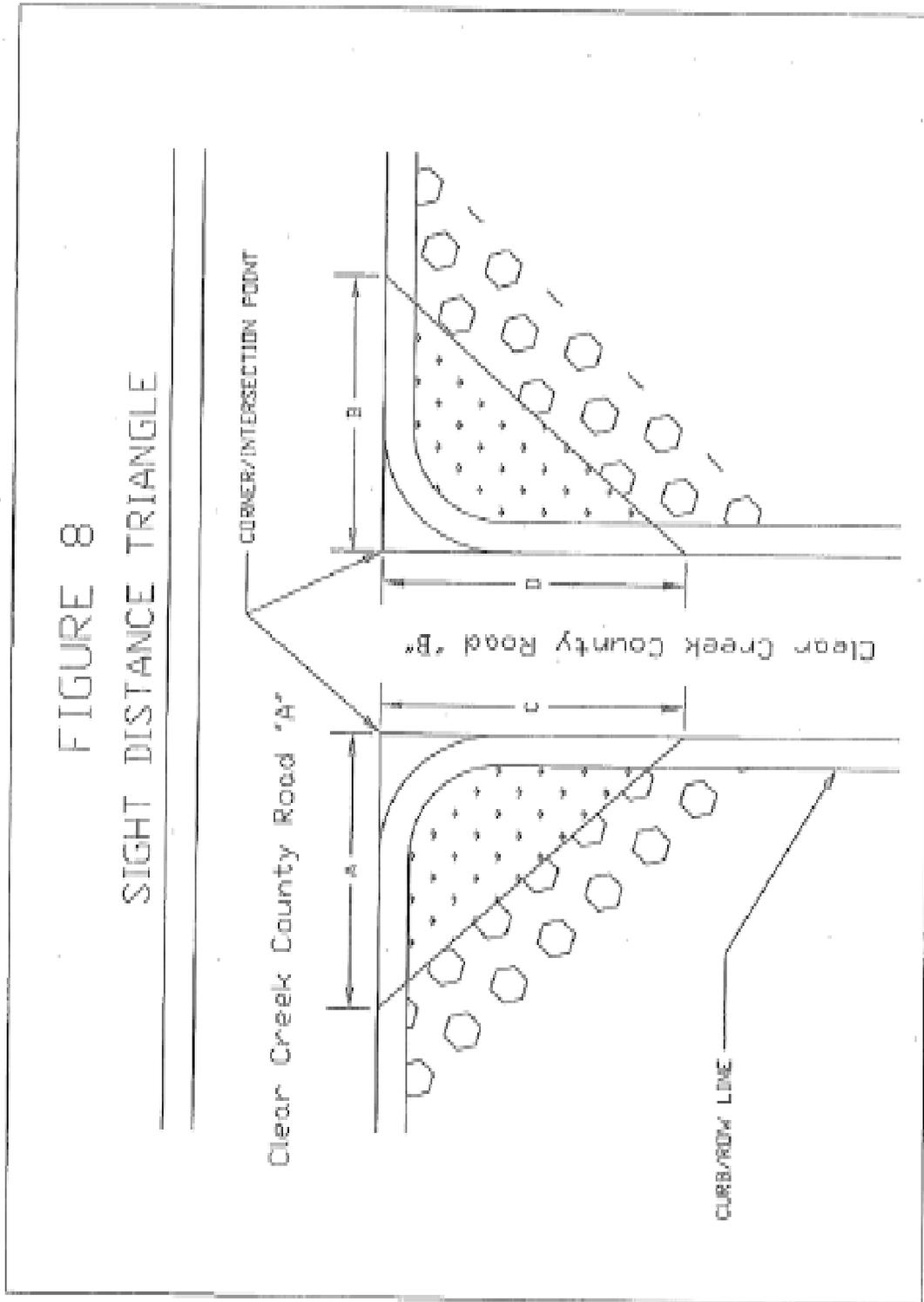


Figure 9 – Sight Distance Triangle (ROW Varies)

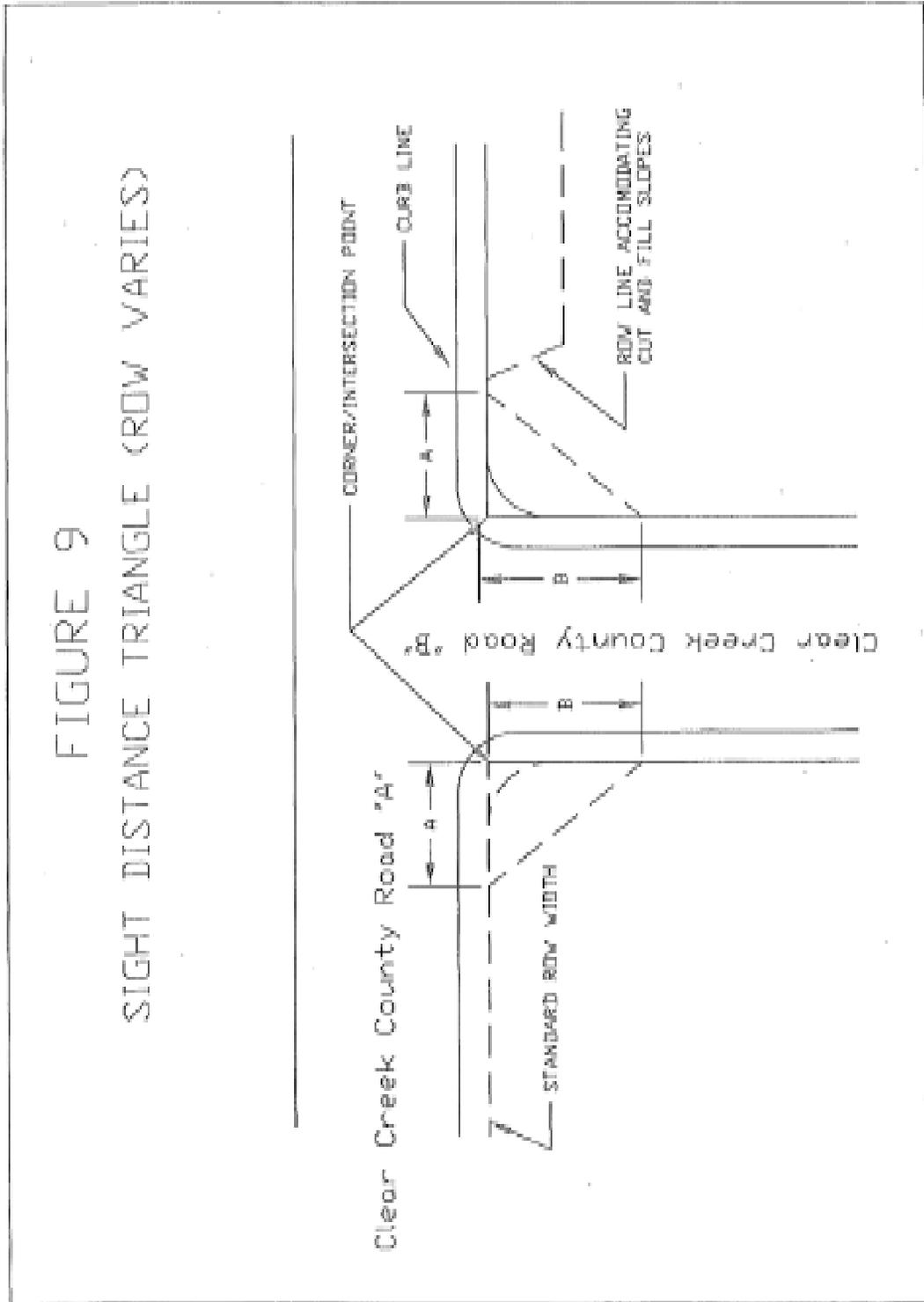


Figure 10 – Examples of Typical Site Distance Triangles

FIGURE 10
EXAMPLES OF TYPICAL SITE DISTANCE TRIANGLES

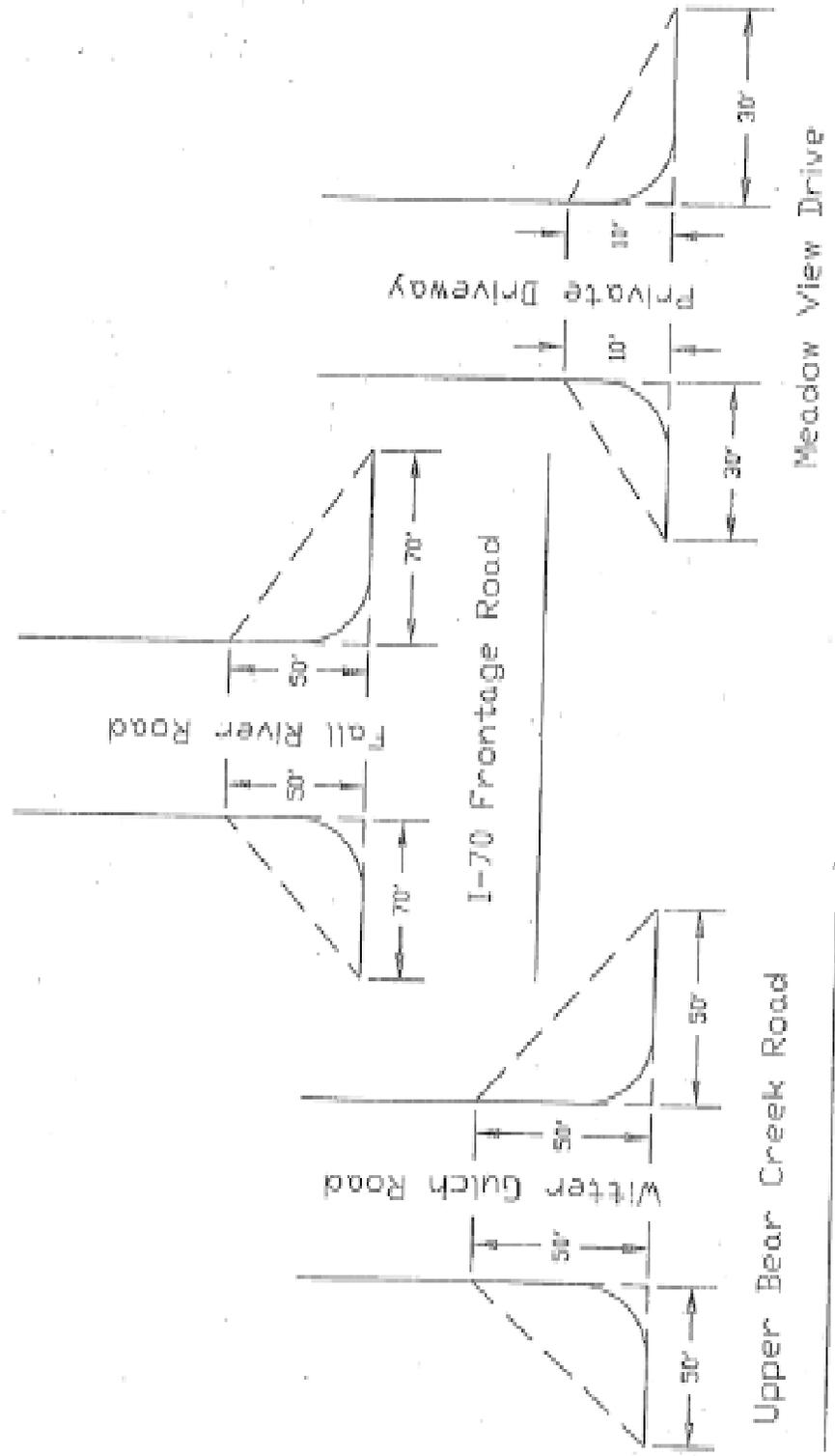


Figure 11 – Indemnification Agreement

FIGURE 11 INDEMNIFICATION AGREEMENT

THIS AGREEMENT, made this ____ day of _____, 20____, between Clear Creek County, Colorado, acting by and through its Board of County Commissioners, whose address is P.O. Box 2000, Georgetown, CO 80444 (hereinafter referred to as "County") and as the duly appointed representative of the users of rural free delivery cluster box, on County Road _____, Clear Creek County, Colorado (hereinafter referred to as "Users").

WHEREAS, Users desire to place a rural free delivery cluster box for postal delivery in the right-of-way belonging to the County, and;

WHEREAS, the County is willing to allow such cluster box to be installed by Users providing they comply with the County's requirements for locating rural free delivery multi box modules and that Users indemnify and hold the County harmless from any damage caused to cluster box by the County or any other party.

NOW THEREFORE, in consideration for the promises made herein, the parties agree as follows:

1. Users agree to defend, indemnify and hold the County, its agents and employees, harmless from all loss, cost, lawsuits, and damage incurred by Users and relating to the rural free delivery cluster box located on Clear Creek County Road, arising from all maintenance, snow removal and general use of the right-of-way for Clear Creek County Road _____, by Clear Creek County and the public.
2. The terms of this Indemnification Agreement shall be binding upon and inure to the benefit of both parties hereto, their respective heirs, executors, administrators, successors and assigns.
3. The County reserves the right to require that Users remove and/or relocate the cluster box in the interest of the public health, safety and welfare.

IN WITNESS WHEREOF, the parties have executed this Indemnification Agreement as of this day and year first written above.

COUNTY:
BOARD OF COUNTY COMMISSIONERS
CLEAR CREEK COUNTY, COLORADO

By: _____,
Chairman

USERS: _____

By: _____

STATE OF COLORADO)
)ss.
County of Clear Creek)

The foregoing Indemnification Agreement was acknowledged before me this day of _____, 20____, by,

My Commission expires: _____

Witness my Hand and Seal

Notary Public _____

Figure 12 – Required Mailbox Installation on Public Roads

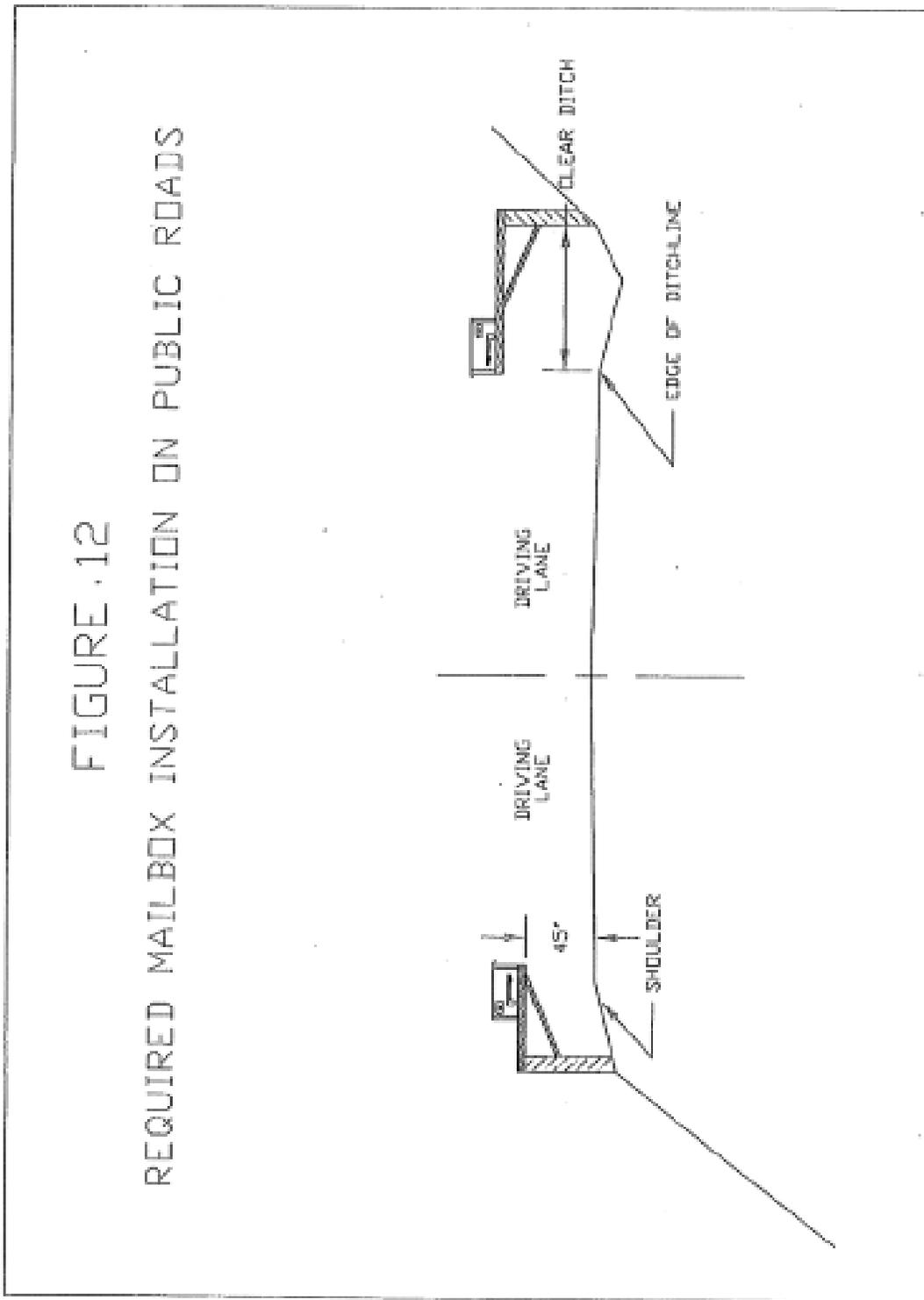


Figure 13 – Typical Cross Section Super Elevated

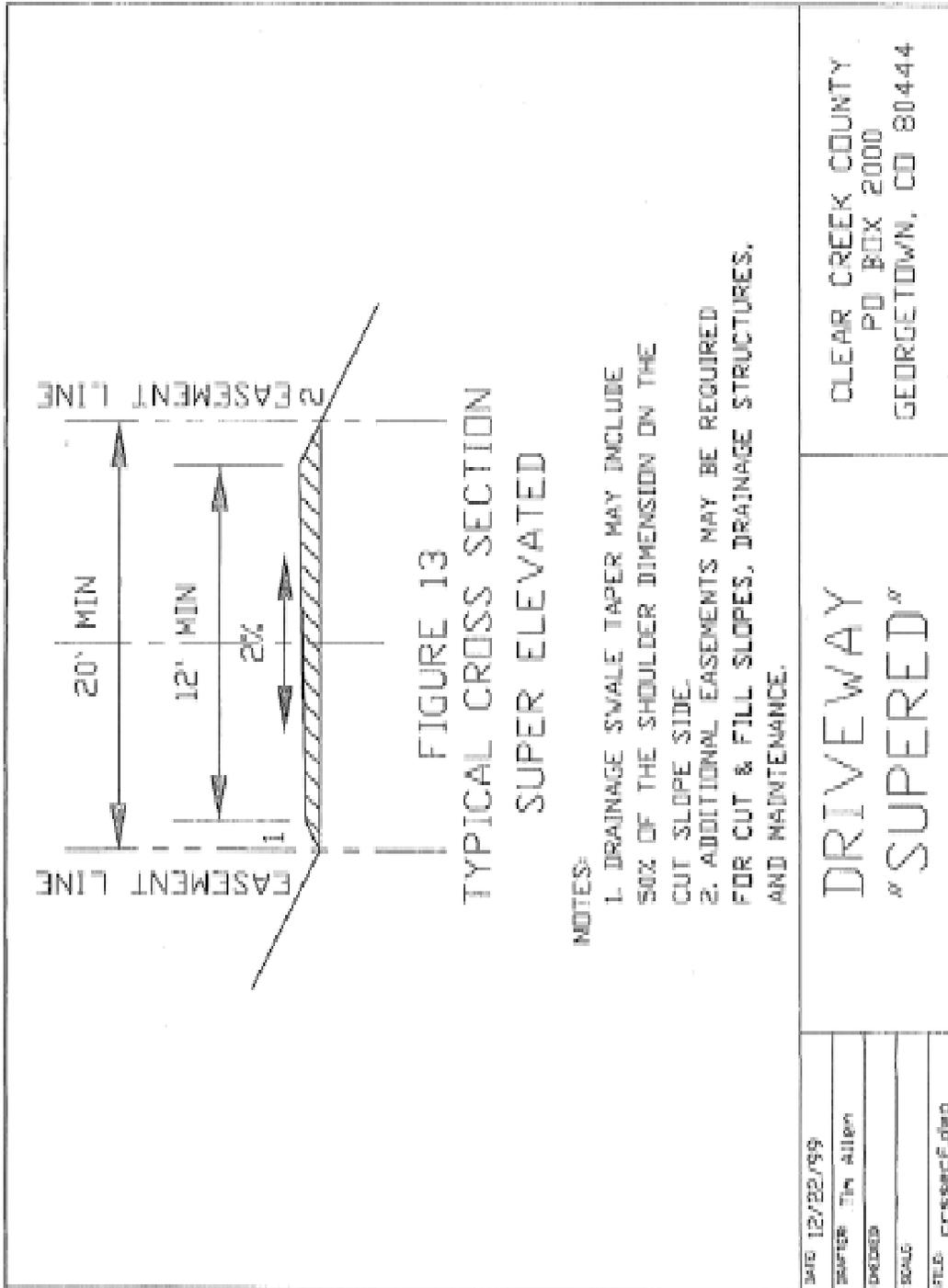


Figure 14 – Typical Cross Section of a Crowned Driveway

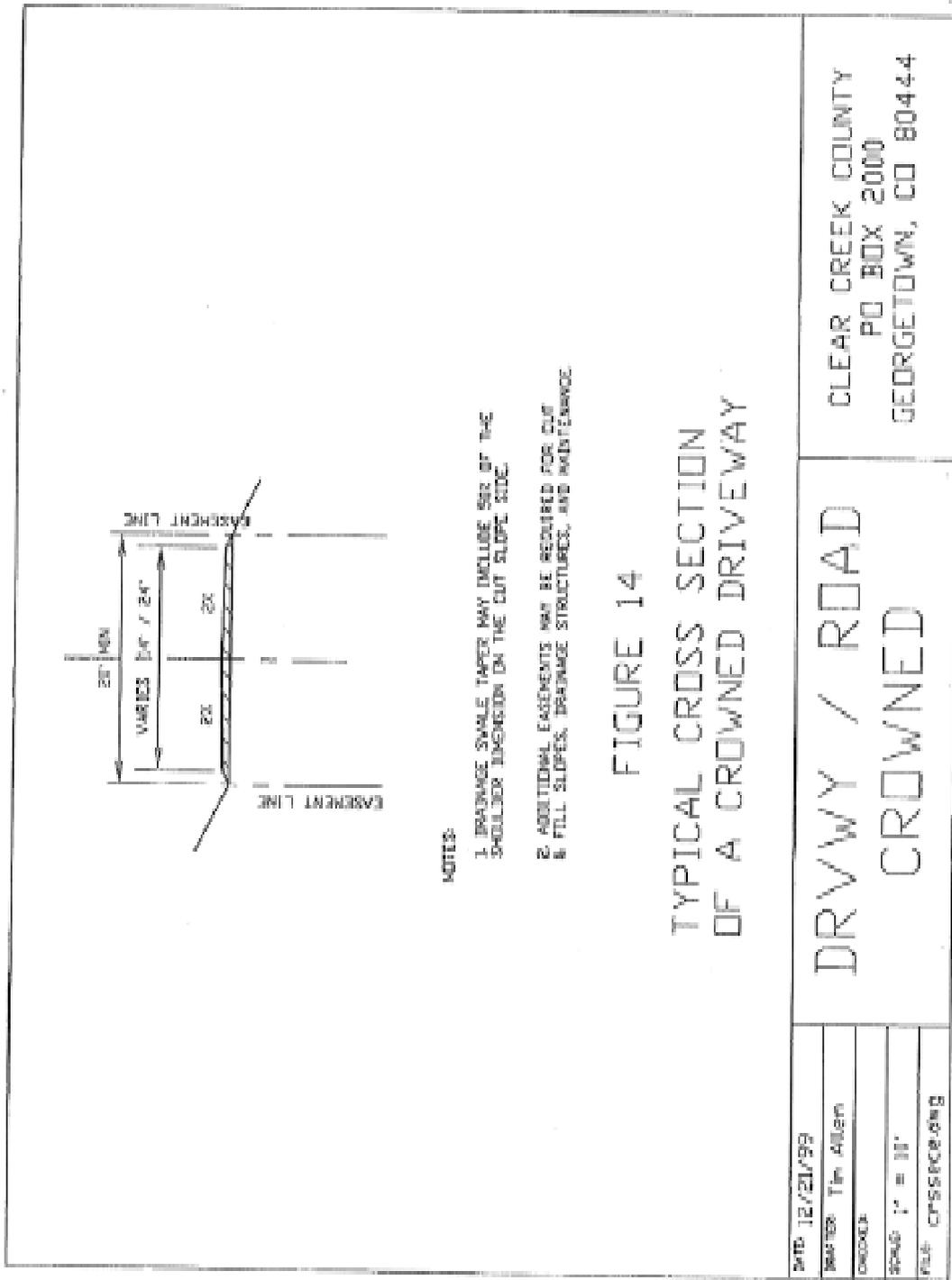


Figure 16 – Driveway/Intersection Spacing

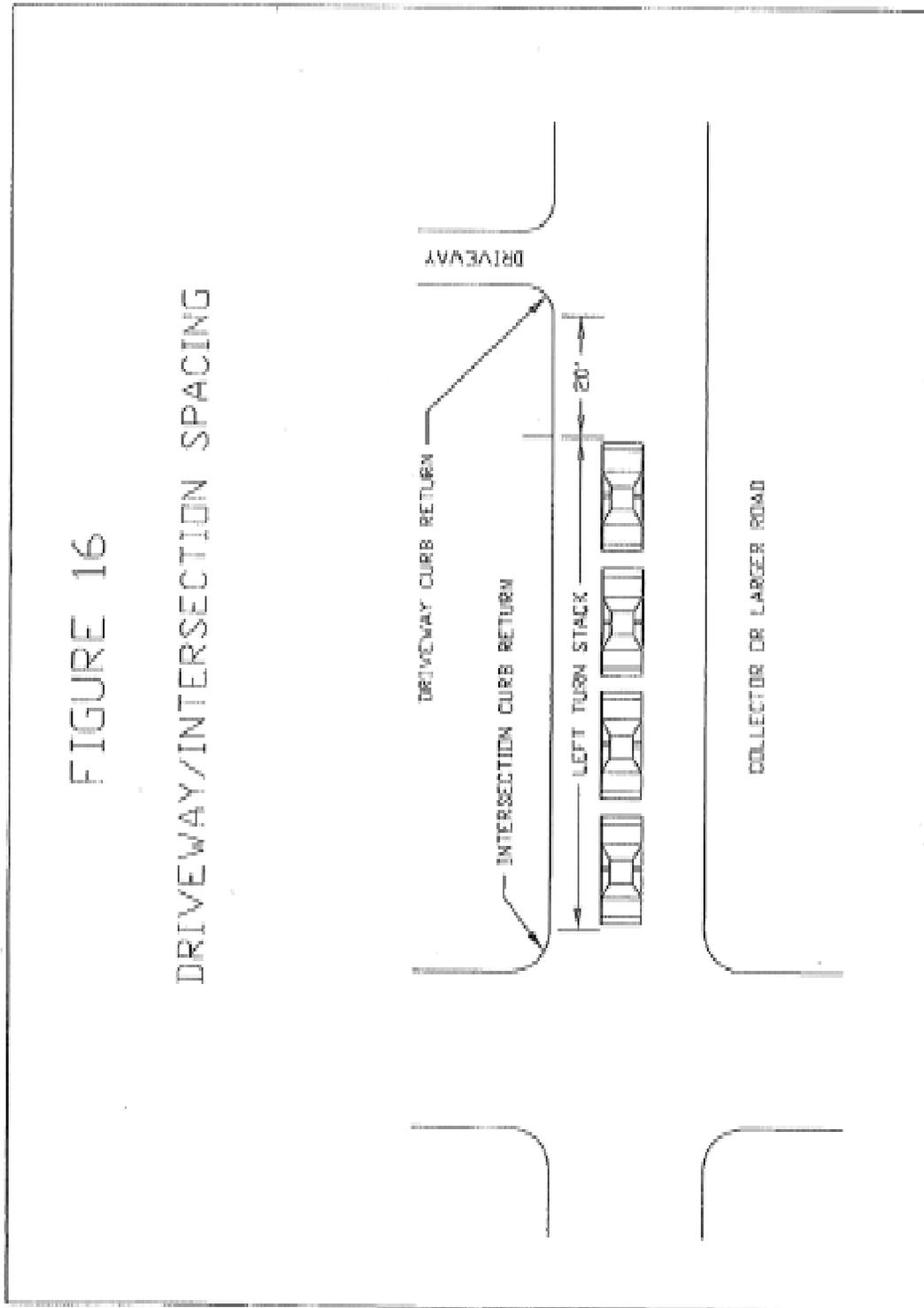


Figure 17 – Parking Layout Dimensions

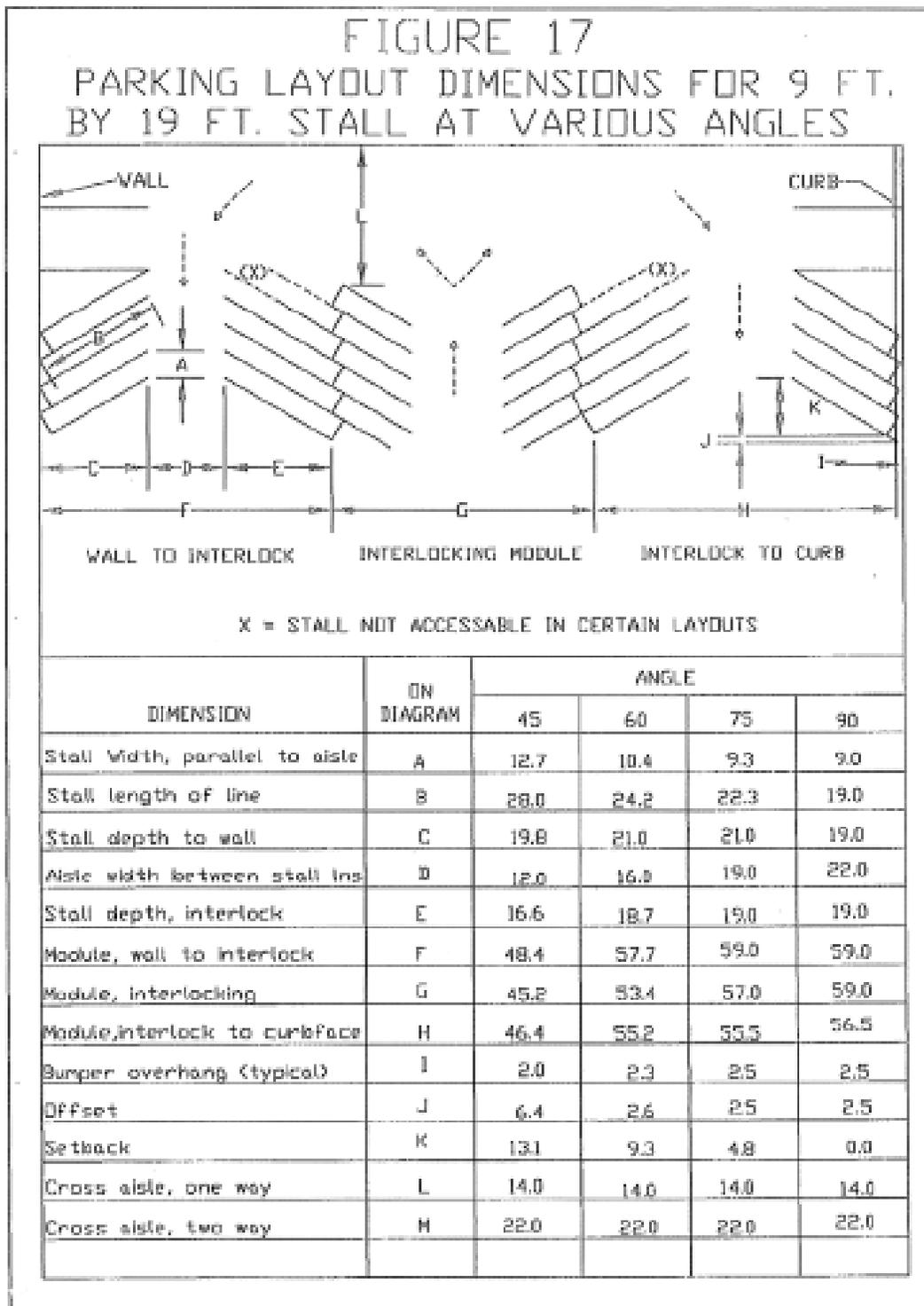


Figure 18 – Minimum Requirements for Road-Cut Backfill

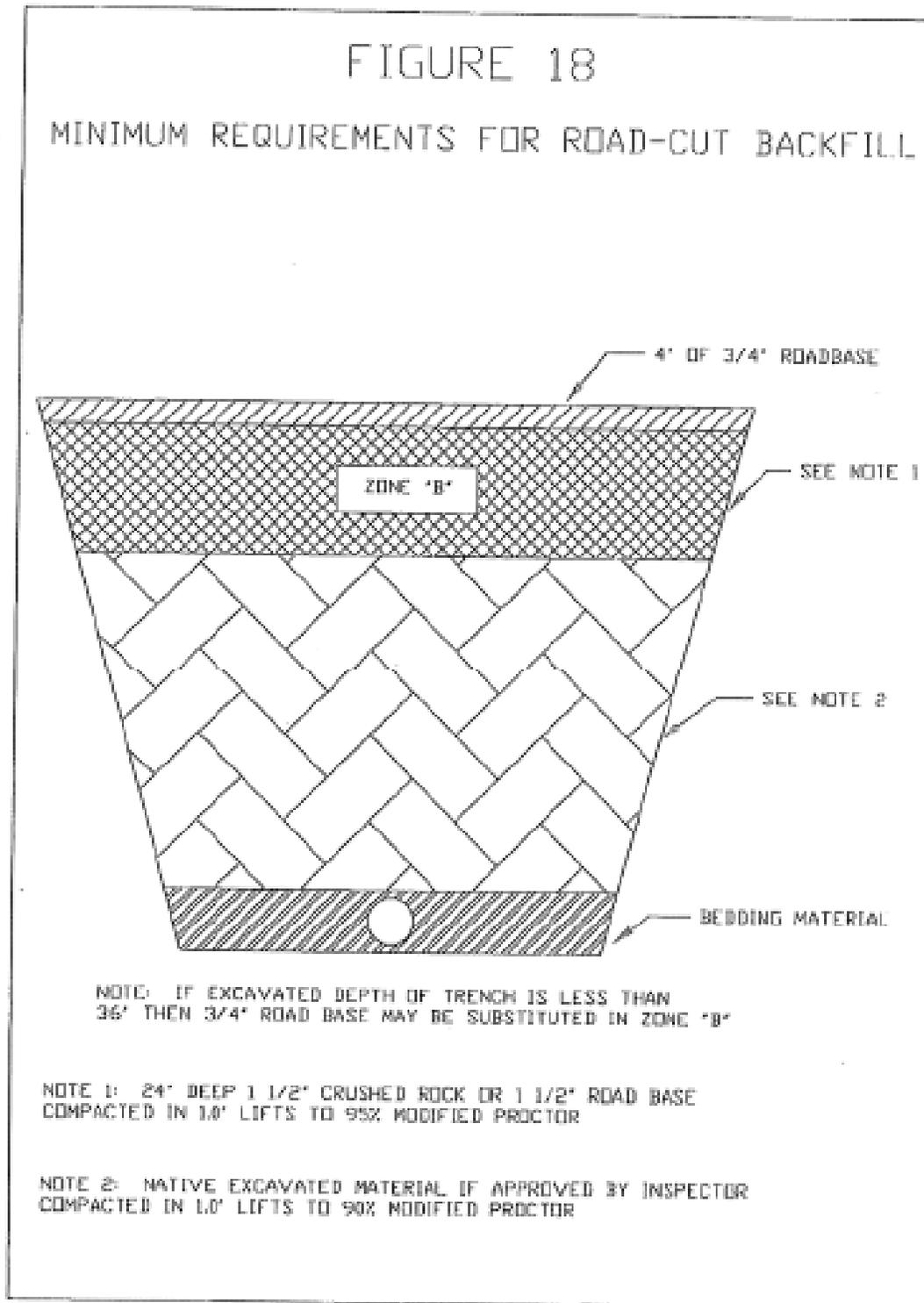


Figure 19 – Minimum Requirements for Road-Cut Backfill Asphalt Roads

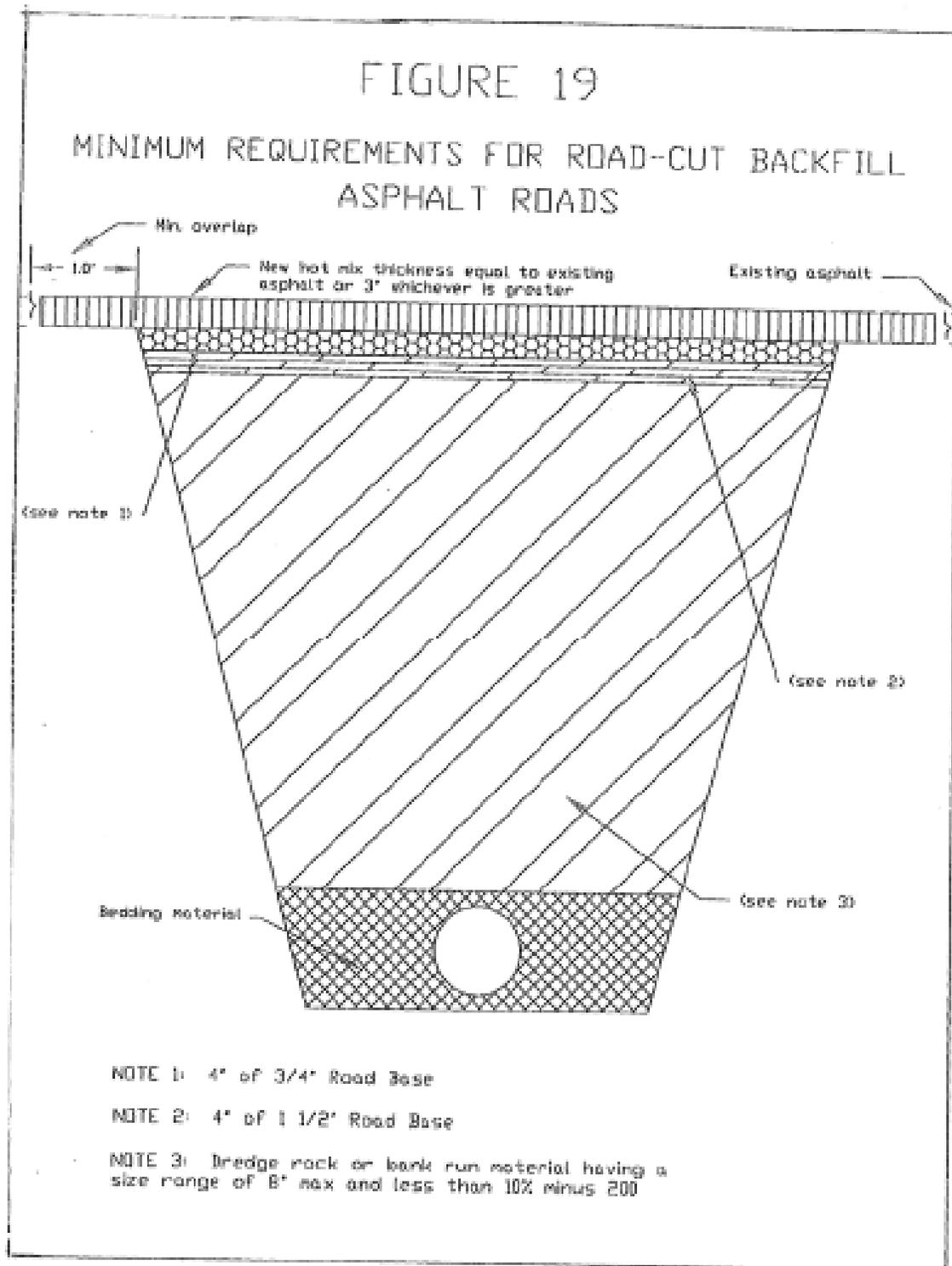


Figure 20 – Acceptable Culvert Bedding Material

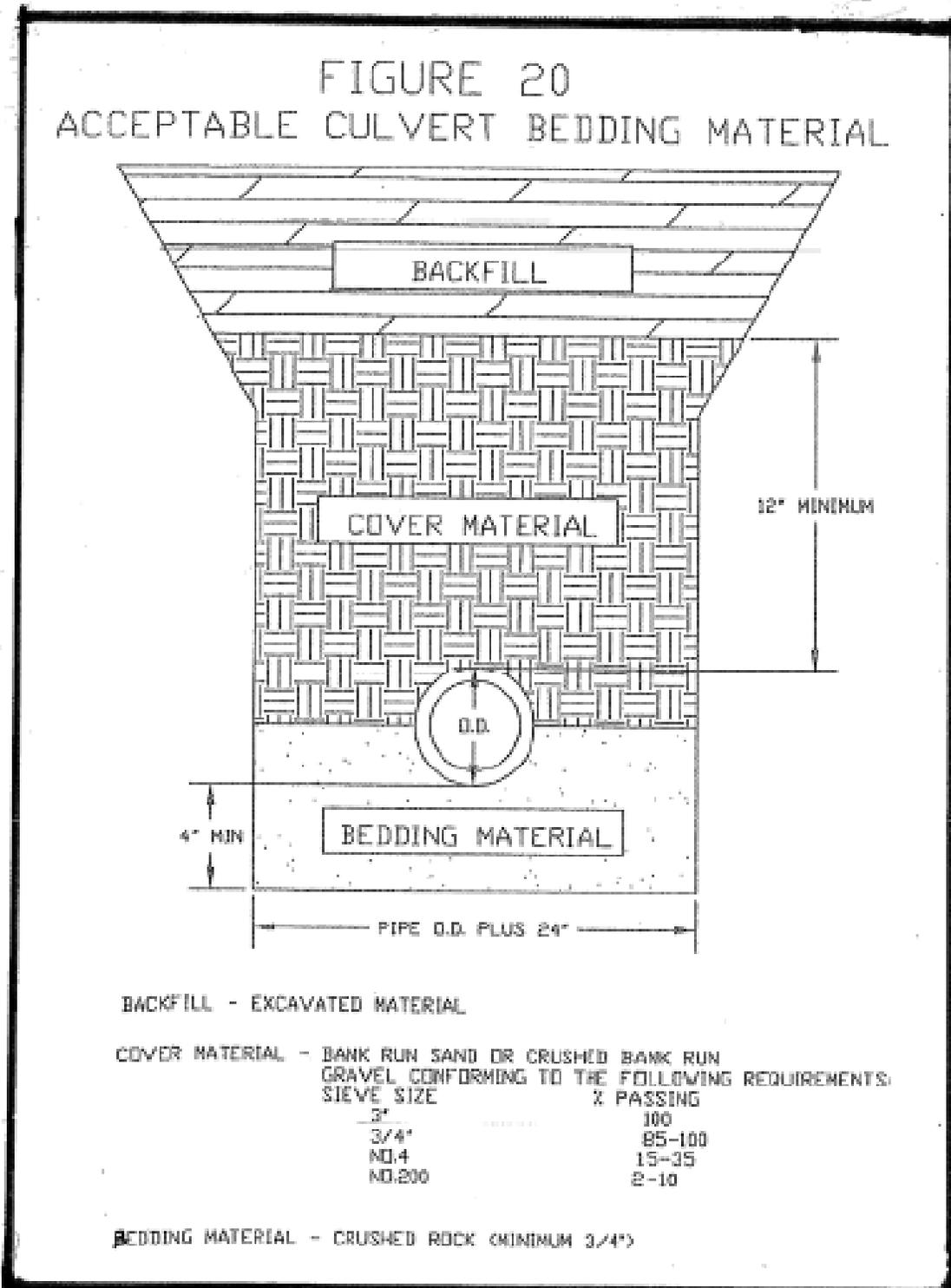


Figure 21 – Examples of Typical Culvert Application

FIGURE 21
EXAMPLES OF TYPICAL CULVERT APPLICATION

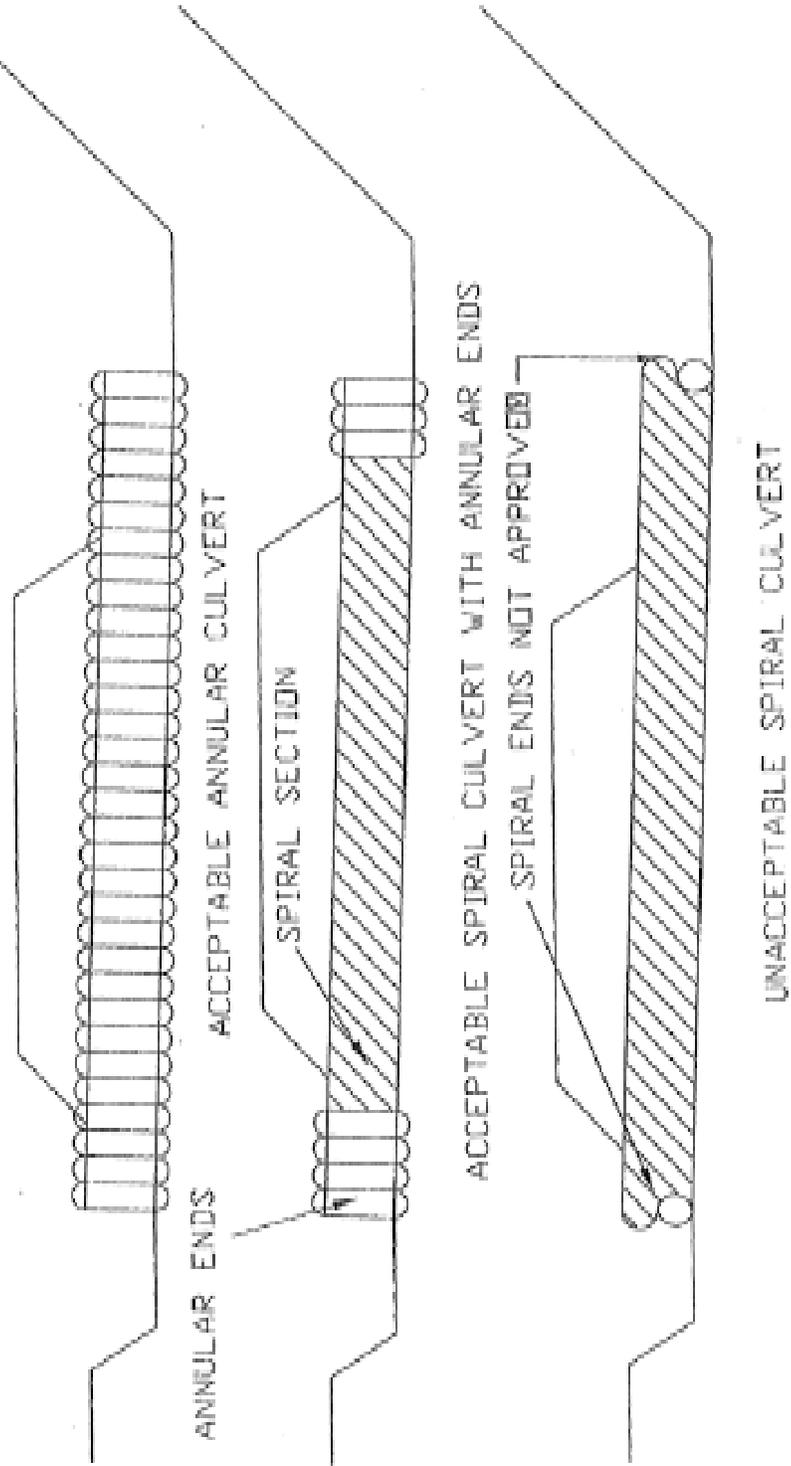


Figure 22 – Typical Drainage Pan Detail

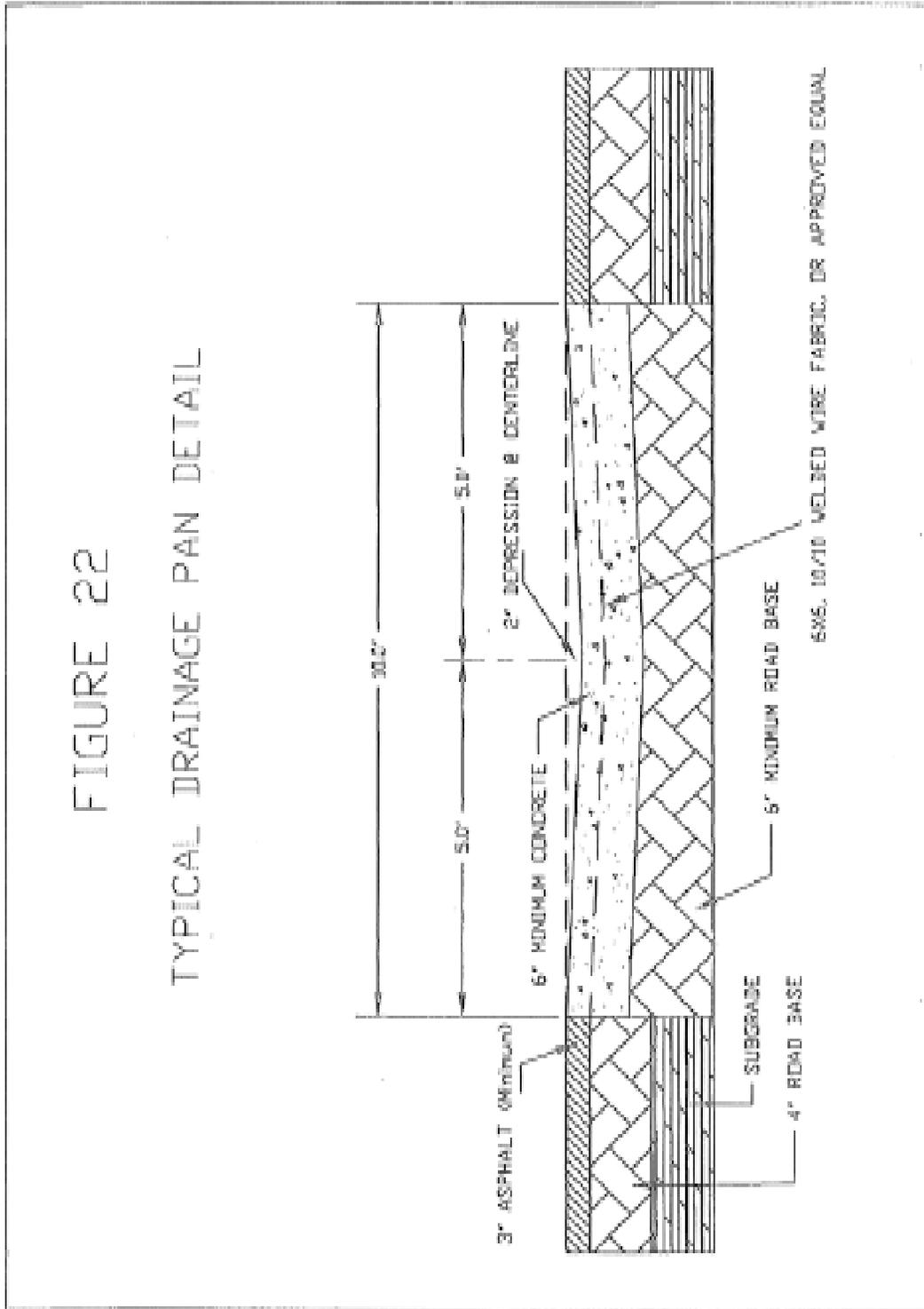


Figure 23 – Driveway Pull Out

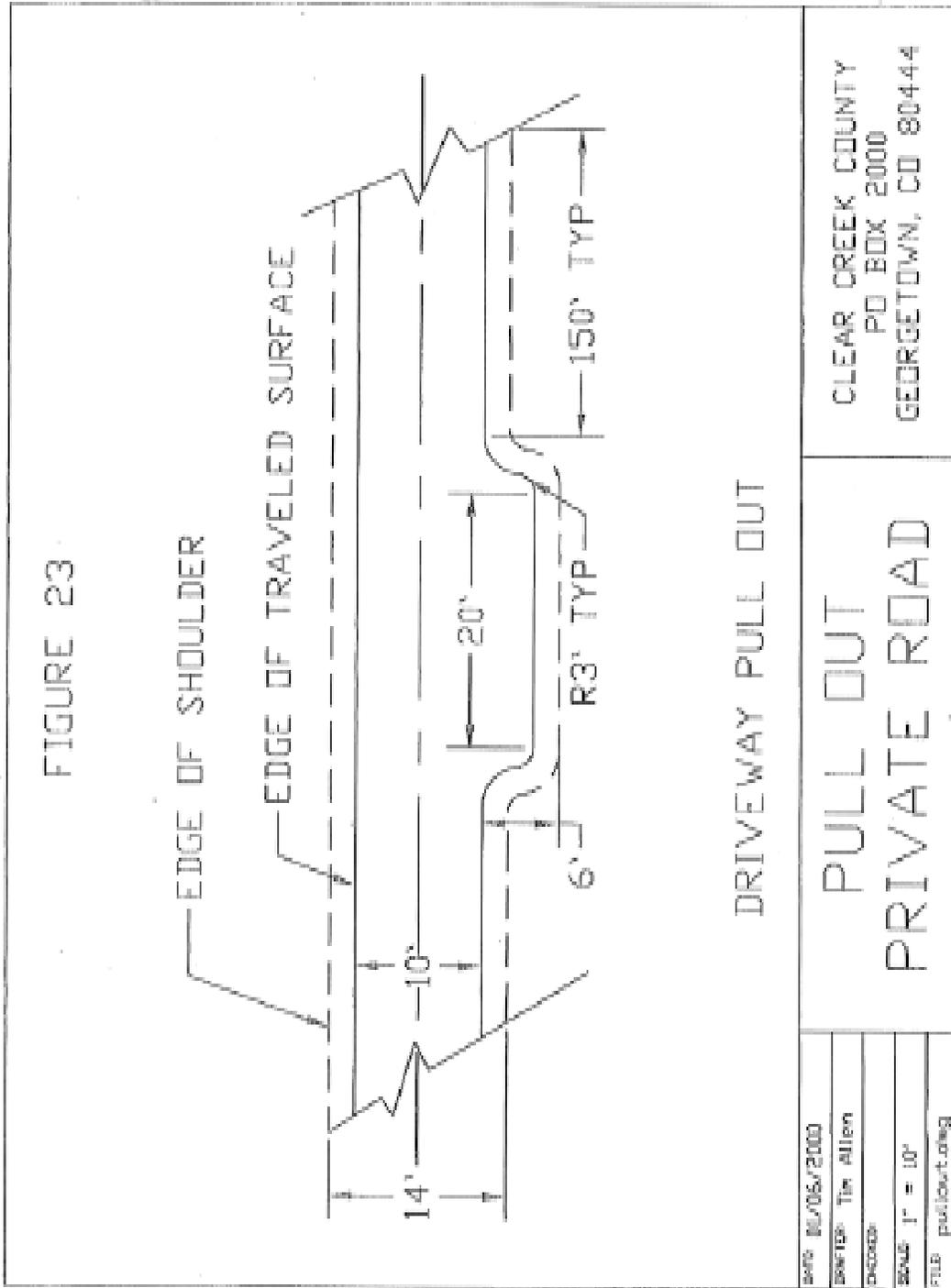


Figure 24 – Driveway Turnaround

