



# LEWIS AND CLARK COUNTY

## Public Works Manual

Policies and Procedures



Lewis and Clark County  
Public Works Department

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Adopted November 25, 2014  
Amended 6/28/2016

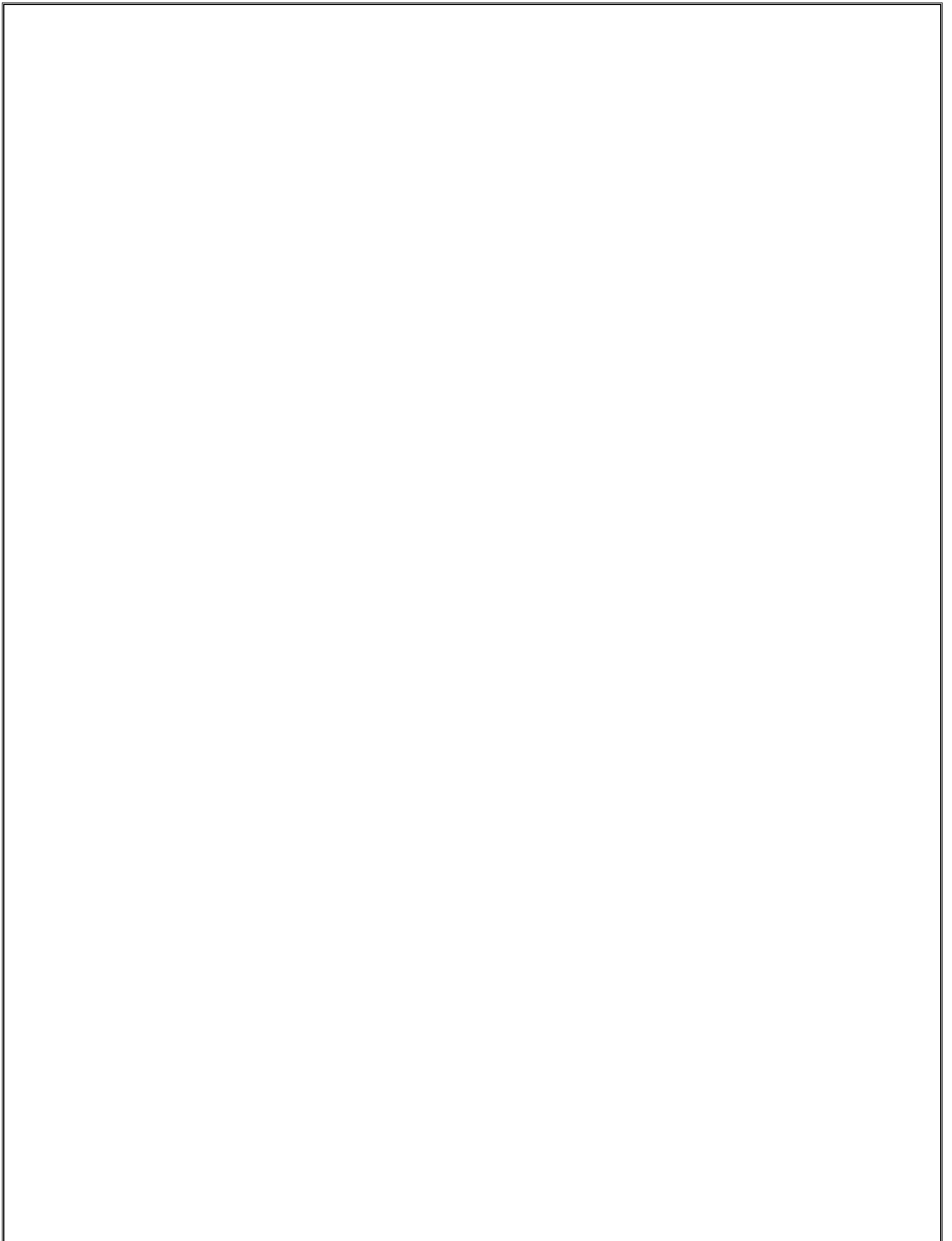


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## SECTION 1. GENERAL PROVISIONS

### 1.1 Definitions

As used within this Manual, except where otherwise specifically defined or unless the context or subject matter clearly otherwise requires, the following terms, phrases words and their derivations shall have the following meanings:

1. AASHTO: American Association of State Highway and Transportation Officials.
2. AADT: Annual Average Daily Traffic; it is the total volume of vehicle traffic of a highway or road for a year divided by three-hundred sixty-five (365) days. AADT is a useful and simple measurement of how busy the road is. It is also sometimes reported as "average annual daily traffic."
3. ADT: Average daily trips made by vehicles or persons in a twenty-four (24) hour period.
4. Applicant: Any individual or entity seeking a permit required by these standards.
5. Approach: The constructed road surface and associated drainage improvements extending from the point at which a road surface, ramp, or driveway enters the right-of-way of another road in order to create an access point or intersection; for example, where a driveway meets a constructed road or where a local access road intersects another road.
6. Boulevard: An area of public road right-of-way or private easement between the edge of the street or road, whether curbed or not, and the sidewalk.
7. Commission: The Board of County Commissioners of Lewis & Clark County, Montana.
8. Competent Person: The term "competent person" as used in many OSHA standards and documents. An OSHA "competent person" is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." 29 CFR 1926.32(f). By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements which must be met by the competent person.
9. Contractor: An individual, general contractor, subcontractor, firm, association, company, partnership, corporation, limited liability partnership, or limited liability company engaged in construction services, who has signed a construction contract with an owner.
10. County: Lewis & Clark County, Montana.

11. Cul-de-sac: A circular turn around located at the end a dead end street.
12. Developer: A person, partnership, company or corporation that engages in the conversion of land from one use to another. (Referred to as Subdivider in Lewis & Clark Subdivision Regulations).
13. Director: The Director of the Lewis & Clark County Public Works Department, or designated representative.
14. Driveway: An access point onto a road that services a residential or non-residential parcel of land.
15. Encroachment: Any object, personal property or improvement, including but not limited to, trees, landscape rocks, debris, signs, mailboxes, fences or private utilities placed, built or located within a public road right-of-way.
16. Engineer: A person licensed in conformance with Title 37, Chapter 67, MCA, to practice engineering in the state of Montana.
17. Excavation: Removing, cutting into, and boring under or in any way disturbing the existing road, ditch or other material within a public road right-of-way.
18. Governing Body: The Board of County Commissioners of Lewis and Clark County, Montana.
19. Hammerhead: An alternative to the cul-de-sac turnaround at the end of a dead end street. A hammerhead consists of two opposite extensions of the dead end road resembling a double-headed hammer that allows vehicles to turn around and exit in a forward facing position.
20. Intersection: As defined by Section 61-8-102(2)(i)(i), MCA, "The area embraced within the prolongation or connection of the lateral curb lines or if there are no curb lines then the lateral boundary lines of the roadways of two highways that join one another at or approximately at right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict." MCA: Montana Code Annotated.
21. MPWSS: Montana Public Works Standard Specifications.
22. Permittee: A property owner or the property owner's designated agent who has been issued a permit as defined herein.
23. Public road right-of-way: Rights-of-way for public use within the jurisdiction of the County and not under the jurisdiction of the Federal government, State of Montana, or cities within the County.
  - a. Public road rights-of-way include but are not limited to:
    - i. County roads as defined by Sections 7-14-2101(2)(b) and 60-1-103(7), MCA;
    - ii. Public highways as defined by Section 60-1-103(22), MCA;

- iii. Dedicated county roads created through a petition or other statutory process (and never subsequently abandoned);
  - iv. Public easements created by reference in a deed to a subdivision plat or certificate of survey on which that public easement is depicted;
  - v. Public access easements or county road easements dedicated to the public and accepted by the Commission on subdivision plats;
  - vi. Public easements created by public prescriptive use as determined by a court of law or court ordered stipulation;
  - vii. Public easements created by eminent domain through condemnation proceedings;
  - viii. Any improvements constructed with asphalt, gravel or native material surfacing such as trails, walk paths or bike paths that may be located within a public or private road right-of-way or within a dedicated non-motorized easement; and
  - ix. The entire width between boundary lines when any part thereof is open to the use of the public for purposes of vehicular travel. For example, those areas between lots and blocks depicted on townsite plats of unincorporated areas of the County.
- b. "Public road right-of-way" refers to a road within the County's jurisdiction regardless of whether the road is maintained by the County.
- c. A public road right-of-way may contain a roadway (such as a gravel road or hard-surfaced road) or non-motorized facility. A public road right-of-way also may contain shoulders, berms, ditches, drainage facilities and utility easements. The term "public road right-of-way" may also be used to describe those public road rights-of-way in which nothing has been constructed or installed for the public's use.
- d. The types of roadways typically found within public road right-of-way include but are not limited to:
- i. Minor Local Road (Gravel): Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 1 - 400.
  - ii. Local Road: Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 401 - 1,500.
  - iii. Minor Collector: Minor collector streets serve the dual functions of distributing traffic between local roads, major collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Minor collector streets

typically carry average daily traffic volumes of 1,501 – 3,500 AADT. Minor Collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.

- iv. Major Collector: Major collector streets serve the dual functions of distributing traffic between local roads, minor collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Major collector streets carry average daily traffic volumes greater than 3,500 AADT. Major collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.
  - v. Arterial: That part of the roadway system serving as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the City of Helena, East Helena, Lincoln, and Augusta. If an arterial roadway standard is needed, the Montana Department of Transportation (MDT) standards for the appropriate roadway shall be used.
24. Public Improvements: Any structure, piece of infrastructure or facility constructed to serve the residents of a subdivision or the general public, such as parks, streets or roads, sidewalks, curbs and gutters, street lighting, utilities, and systems for water supply, sewage disposal, fire suppression and drainage.
25. Right-of-way: An interest in property, also called an easement, often depicted on a survey or subdivision plat as a strip or area of land including surface, overhead or underground, created for construction and maintenance of highways and other public roadways or to provide access, including but not limited to drainage ditches or storm water retention; electric power, telephone and fiber optic lines; water, sewer and other pipelines.
26. Runoff: That part of precipitation that flows over the land without infiltrating into the soil or being absorbed by plant material.
27. Shared access: A driveway used by more than one (1) lot; this is generally seen where two (2) or more lots share a common boundary, abut the same road, and use one (1) approach rather than utilizing individual approaches.
28. Segment: A section of road between one (1) road intersection and the next closest road intersection. A segment of road does not include sections of roads outside the jurisdiction of the County.



29. Sidewalk: Any improvement intended exclusively for pedestrian use that may be located within a public or private right-of-way, and may be constructed in combination with concrete curb and gutter improvements.
30. Surveyor: A person licensed in conformance with Title 37, Chapter 67, MCA, to practice surveying in the state of Montana.
31. Swale: A drainage channel or depression that collects or directs surface water.
32. Topography: General term to include characteristics of the ground surface such as plains, hills, mountains, degree of relief, steepness of slope, and other physiographic features.
33. Traveled Way: The portion of roadway for the movement of vehicles, exclusive of shoulders, berms, ditches, sidewalks, and parking lanes.
34. USCS: Unified Soil Classification System.

## 1.2 Applicability

The standards contained within this Manual shall be applicable to:

1. The construction and maintenance of roads, appurtenant structures, and utility facilities built within public road rights-of-way.
2. The construction of all new approaches, existing approaches or where property improvements or development require approval of the Public Works Department.
3. The erection or placement of all new traffic control signs, mailboxes, and appurtenant structures within public road rights-of-way.
4. Nothing in this Manual shall be construed to require that the County undertake to construct, reconstruct, widen, maintain, or improve a road within the public road rights-of-way to the standards and specifications contained in this Manual.
5. Nothing in this Manual shall be construed to require that those portions of new or existing private roads or approaches outside public road rights-of-way in the County, be constructed, reconstructed, widened or improved to the standards and specifications contained in this Manual.
6. Nothing in this Manual shall be construed to obligate the County to accept any new or existing public or private road rights-of-way for maintenance, regardless of the standards and specifications used for the construction of such roads.
7. Maintenance of all public road rights-of-way within the County is determined by the County per Section 7-14-2103 MCA.

### **1.3 Standard Specifications**

Except where these standards provide otherwise, design, workmanship and materials shall be in accordance with the current edition of the following specifications, regulations and guidelines:

1. Standard Specifications: The standards for County roads and bridges, and all other construction within the public road right-of-way, shall consist of:
  - a. The County Road Design Standards (Section 4);
  - b. The Lewis & Clark County Bridge Standards (Appendix B); and
  - c. The current published edition of the Montana Public Works Standard Specifications (MPWSS) published by the Montana Contractor's Association.
2. Reference Standards: To implement the above standards, the following publications shall apply:
  - a. The current version of the Montana Roadway Design Manual, published by the MDT;
  - b. The current version of the Standard Specifications for Road and Bridge Construction, published by the MDT;
  - c. The current version of the Policy of Geometric Design of Highway and Streets, published by the American Association of State Highway and Transportation Officials (AASHTO);
  - d. The current version of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration;
  - e. Roadside Design Guide, published by AASHTO;
  - f. Standard Specifications for Highway Bridges, published by AASHTO;
  - g. Applicable rules, regulations, and resolutions, adopted by the Commission; and
  - h. County Subdivision Regulations in effect at the time the preliminary subdivision application is determined to be complete and sufficient.
3. In the event of conflict with any of the specifications listed in Section 4 of the County Public Works Manual, the Public Works Department shall specify, in writing, which of the standard specifications will apply.

### **1.4 Applicable Laws, Safety and Indemnification of Lewis & Clark County**

1. Any Contractor working within a public road right-of-way or any other County property shall give all notices, obtain all permits, and comply with all federal, state and local laws, ordinances and regulations affecting the conduct of the work, and shall indemnify and hold harmless the County and its representatives against any claim or liability arising

from, or based on, the violation of any such law, ordinance, regulation, etc., whether by Contractor, Contractor's Subcontractor, Supplier or Permittee, or any of their employees or agents (all herein referred to as Contractor).

2. The Contractor shall follow all rules and regulations of federal, state, and local health officials. The Contractor shall not require an employee to work in surroundings, or under conditions that are unsanitary, hazardous or dangerous to health or safety. The Contractor shall admit any Occupational Safety and Health Administration (OSHA) inspector or other legally responsible agency involved in safety and health administration without delay and without presentation of an inspection warrant to all areas of the work, project site, County property, or right-of-way upon presentation of proper credentials.
3. The Contractor shall comply with and enforce all federal, state, and local safety standards for Contractor's employees on the project, protecting and indemnifying the County and its representatives from all claims, suits, damages or liabilities from all accidents or safety violations, and ensuring the public's safety.
4. All Contractors working within a public road right-of-way or County property, either contracted by the County or permitted by the County shall adhere to all OSHA, Montana Department of Labor and Industry, or other industry standard safety requirements. At a minimum a Contractor will have a competent person onsite at all times while work is being done. It is the Contractor's responsibility to ensure that all work is being completed in a safe and hazard free manner.
5. If requested by the County, the Contractor will provide paperwork on all competent persons.
6. The County reserves the right to stop work if at any time the County observes a safety concern. This concern will be addressed by the Contractor's competent person immediately and before any work can continue. It is the competent person's responsibility to properly determine how to address and eliminate the safety concern. The County will not direct the Contractor on the means or methods of how to address the safety concern or how to safely construct the project.
7. If the Contractor disagrees with the County and continues working in an unsafe manner or does not have a competent person on site, the County is obligated to report this concern to the proper authority and wait for their recommendations on how to proceed. The County reserves the right to stop work at any time for any reason.
8. If the Contractor is frequently observed violating safety regulations throughout the course of a project the County reserves the right to revoke all permits, contracts or agreements and stop work indefinitely. The County may remove any installations and return public road right-of-way or County property to pre-construction condition; all costs are the responsibility of Contractor.

- a. The Contractor will not be re-issued a permit or be given authority to perform work on County property until an extensive review has been completed by OSHA, Montana Department of Labor and Industry, or other relevant safety agency. The Contractor will provide paperwork showing that all employees working on site have been properly trained by a certified third party safety trainer and have been issued all relevant certifications necessary to continue the work.
- b. The County reserves the right to hire a third party safety inspector to oversee the project at the cost of the Contractor, if and when the project is re-permitted.
- c. The County reserves the right to require higher insurance limits and bonding for the duration of the project. The County may also require a third party risk audit of all accidents and safety violations the Contractor has had in the recent past, at the cost of the Contractor, to determine the proper increases in insurance and bonding requirements.

## 1.5 Permitting and Fees

1. Any proposed project that occurs in or near an intermittent or perennial natural water body is subject to review and approval by various local, state, and federal agencies. To ease the permitting process, many agencies use the "Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains and Other Water Bodies," which is provided in Appendix C, and is available from the following source:

Helena Regional Office  
1424 Ninth Avenue  
P.O. Box 201601  
Helena, Montana 59620-1601  
Phone: (406) 444-6999  
<http://dnrc.mt.gov/Permits/StreamPermitting/JointApplication.asp>

The County does not review this application nor does it issue any permit for working in or near water bodies. Any individual performing work in the vicinity of a natural water body should contact the agencies listed on the joint application to determine which permits are applicable to their project.

2. Any construction activity which results in the disturbance equal to or greater than one (1) acre of total land area will need to obtain permit coverage from the Montana Department of Environmental Quality (Montana DEQ) with the "General Permit for Storm Water Discharge Associated with Construction Activity," available from the following source:

Montana DEQ Office  
Lee Metcalf Building  
1520 East Sixth Avenue  
Helena, MT 59601

Phone: (406) 444-2544

<http://www.deq.state.mt.us/wqinfo/MPDES/StormwaterConstruction.asp>

The County does not review this application nor does it issue any permit for storm water discharge permits. When the permit is issued by the Montana DEQ, the Contractor shall submit the approved Storm Water Pollution Prevention Plan (SWPPP) to the County. The County will use this permit as a reference during routine County inspections of the project and may act as an agent for the Montana DEQ.

## **1.6 Modification Process**

The policies, procedures and standards contained herein are to be used to ensure the uniformity of all work done within Lewis & Clark County. As policies, procedures and standards change within the Public Works Department this document will change accordingly. Modification to this Manual will follow the basic guidelines:

1. The Public will be notified in accordance with state statute;
2. A fourteen (14) day public review process will commence after proper notification has been given; and
3. Final changes will be presented by the Public Works Department to the Commission during one of its regularly scheduled public meetings, for a public hearing; and
4. The Commission will decide whether or not to approval the presented changes.

## **1.7 Severability**

Where any word, phrase, clause, sentence, paragraph, section, or other part of these regulations is held invalid by a court of competent jurisdiction, such judgment shall affect only that part held invalid.



## **SECTION 2. APPROACHES**

The County requires an approach permit prior to the construction of a new or improved approach that provides access to or from a public road right-of-way. A permit is required to ensure that the proposed approach, when constructed, meets certain standards set forth in this Section. To further ensure that the standards are met, the Public Works Department requires the landowner to contract with a County-certified approach installer as defined in this Section. These approach standards and permit process are required for the County to prevent degradation of existing public infrastructure. An example of an Approach Permit Application is provided in Appendix A.

### **2.1 Permits and Fees**

All new or improved approaches onto public road rights-of-way require an approach permit issued by the Public Works Department. No construction in a public road right-of-way will be allowed until an approved approach permit has been issued.

Once an approach permit is issued, the Permittee has twelve (12) months to install the approach. Failure to install the approach within the twelve (12) month period voids the permit and reapplication is necessary.

Any person or entity making application for permission to construct an approach into a public road right-of-way shall pay the current fee for each approach permit to the Permit Coordinator. Current fee schedules are available from the Public Works Department or the Community Development and Planning Department.

### **2.2 Certified Installer**

Approaches shall only be installed by contractors that have been certified by the Public Works Department as having training and experience necessary to properly install approaches that meet safety, drainage, and durability standards. The Public Works Department will enact a certification process within six (6) months of the date this Manual is adopted by the Commission. Certified installers shall meet all requirements set forth by the Public Works Department for certification and pay any applicable fees. Prior to establishment of the certification process, permits may be issued to non-certified installers provided they install approaches according to all of the requirements of this Section.

### **2.3 Construction Costs**

The Permittee and/or Applicant shall be responsible for all costs associated with the construction of the approach and any appurtenances on the public road.

## **2.4 Number and Arrangement of Approaches**

The location, number and configuration of all approaches to public roads requested by the Permittee and Applicant are subject to the approval of the County. The number of approaches should be the minimum number to provide access to the property.

## **2.5 Maintenance**

The County reserves the right to make any changes within the public road right-of-way that may be necessary to provide proper protection and safety for the public or maintenance of the public road right-of-way. However, nothing in this Section shall be construed to require the County to perform maintenance or repairs on approaches within public road rights-of-way. Maintenance and/or repairs of approaches deemed necessary by the County shall be the responsibility of the Permittee/Property Owner who uses that approach or the assessed properties within a Rural Improvement District (RID), if a purpose of the RID is to maintain and/or repair approaches.

## **2.6 Indemnification**

The Permittee/Property Owner shall hold harmless and indemnify the County and its duly-appointed agents and employees against any action for personal injury or property damage sustained by reason of the exercise of the permit.

## **2.7 Design and Layout of Approaches**

The County has the sole discretion of determining the most suitable design and layout of all approaches to public road rights-of-way. The design and geometric layout should be in accordance with the following requirements and as shown in Figure 6 of Appendix C:

1. All materials must be inspected and approved by the County.
2. Sight distance must be provided as required by AASHTO.
3. The approach grade shall conform to the slope of the roadway shoulder where practical and if possible be equal to or less than three (3%) percent slope for a distance of twenty (20') feet back from the public road surface unless otherwise directed by the County.
4. The approach shall intersect the public road at an angle of ninety (90) degrees (plus or minus ten (10) degrees) to the roadway.
5. The residential approach width shall be between twelve (12') feet and thirty (30') feet, not inclusive of any radius between the approach and the public road. Approaches shall be no wider than necessary to serve the engineering design requirements of the access purposes of the property use.
6. Approaches for driveways and roadways shall be constructed from the edge of the traveled way the approach accesses to the boundary of the road right of way.



7. Vertical clearance of fourteen and one half (14½') feet shall be maintained for the full width of the approach on local roads. Vertical clearance of sixteen and one half (16½') feet shall be maintained for the full width of the approach on major and minor collector roads.
8. Approaches must be constructed in accordance with the current County Road Standards for construction specifications (Section 4.5).
9. When an approach accesses a hard-surfaced arterial, collector, or minor collector, the approach must be built with hard surfacing. Hard surfacing can be accomplished with either concrete or asphalt.

For gravel public roads and hard surfaced low traffic volume (less than 400 ADT), low speed (30 mph or lower) roads within subdivisions, hard surfacing of the approach is not required but the approach must be constructed with an approved crushed material over an approved sub-base material. If subdivision covenants or an RID require hard surfacing, the approach must conform to these requirements.

10. The return radius between the approach and the public road shall be sufficient to accommodate the largest AASHTO design vehicle anticipated to regularly access the facility. At a minimum, the radius for a driveway serving a single-family residence or two-family residence shall ten (10') feet unless otherwise approved by Public Works staff. The minimum curb radius for a driveway serving a multi-family residential project, a commercial or institutional development, and a road or street shall be determined by a qualified engineer based on the design vehicle criteria and drainage considerations.
11. Non-residential driveways approaching hard surfaced public roads are required to provide hard surfacing for the length and width of the approach within the right-of-way. Hard surfacing shall be an engineered design to meet necessary loading and site-specific requirements, but at a minimum shall be constructed within the right-of-way as follows:
  - a. Concrete of sufficient thickness to provide adequate support for the largest AASHTO design vehicle anticipated to regularly access the facility over an approved base material; or
  - b. Asphalt of sufficient thickness to provide adequate support for the largest AASHTO design vehicle anticipated to regularly access the facility and over an approved base material.
  - c. The radius between the approach and the public road shall be of sufficient length to accommodate the largest AASHTO design vehicle anticipated to regularly access the facility.
12. Non-residential approaches to a graveled public road shall be an engineered design to meet necessary loading and site-specific requirements.
13. All approaches shall meet sight distances as required by AASHTO. The minimum spacing between an approach and a street intersection near edge and centerline shall meet AASHTO recommendations. At a minimum, the near edge of an approach must be at

least forty (40') feet from the near edge of an approach on an adjacent property (forty-five (45') feet on collectors) and fifty (50') feet from the centerline of an adjacent or nearby roadway.

14. For either adjacent new approaches or where a new approach may be adjacent to an existing approach, a shared access may be required by the County.
15. Existing drainage in the public road right-of-way shall not be altered or impeded without specific approval from DEQ and the County on the approach permit.
16. Drainage from an adjacent driveway, private road, or structure is not allowed to discharge onto the public road. For this reason, drainage structures designed to keep storm water drainage in the ditches of the public road right-of-way may be required by the approach permit. When drainage structures are required, the specific size of the opening, length of pipe or other design features shall be as noted on the approach permit.
17. All culverts used in the construction of an approach in a public road right-of-way must have the minimum diameter specified in Table 4.1 unless a smaller diameter culvert is specified on an engineered drainage plan and/or is approved by the Public Works Department and must be either double-wall smooth interior high-density polyethylene (HDPE), corrugated metal pipe (CMP) or reinforced concrete pipe (RCP) or other approved similar material. Flared end terminal sections or adequate end treatments (riprap) are required and as directed by the County. The minimum amount of cover material over the culvert shall be that recommended by the culvert manufacturer.

## **2.8 Design and Geometric Requirements**

Approaches shall meet the dimensional standards contained in Appendix C Figure 6 – APPROACH DIMENSIONAL STANDARDS.

## **2.9 Covenants, Zoning and Other Restrictions**

An approach permit will not be issued unless it complies with covenants, zoning, storm water drainage plans, subdivision conditions, institutional controls, floodplain regulations, and any other restrictions associated with the property.

## **2.10 Penalty/Enforcement**

If the County determines an approach is not in substantial compliance with these standards, the Permittee/Property Owner(s) of the approach will be notified and allowed to correct the deficiency. If the deficiency is not addressed within thirty (30) days, either by corrective action or by notifying the County of a proposal for corrective action, the County will treat the unpermitted or non-compliant approach as an encroachment and will take appropriate action to remedy the situation in accordance with Sections 7-14-2134 through 7-14-2138, MCA.

## **SECTION 3. ENCROACHMENTS**

### **3.1 Encroachment Permits**

Encroachments are any object, personal property or improvement, including but not limited to, trees, landscape rocks, debris, signs, mailboxes, fences or private utilities placed, built or located within a public road right-of-way. Encroachments in a public road right-of-way may be allowed at the discretion of the Public Works Director, with the issuance of an encroachment permit (an example of the Encroachment Permit Application is provided in Appendix A). No encroachment will be allowed that will interfere with the public's safe use of the easement or hinder the County's ability to maintain the public road right-of-way. The County reserves the right to revoke an encroachment permit or not issue an encroachment permit where the encroachment is deemed to be a threat to public safety, interfering with maintenance, or a public nuisance. The County may require the removal of any encroachment, in accordance with Sections 7-14-2134 through 7-14-2138, MCA, and the following County procedures:

1. When provided notice or upon discovery of an encroachment that does not block any portion of the travelled way and is not considered to be an imminent threat to public health or safety, the County will provide written notice of the encroachment to the property owner and the encroachment shall be removed within fourteen (14) days. If the property owner does not remove the encroachment within fourteen (14) days, the County may proceed with removal of the encroachment in accordance with MCA statutes.
2. When provided notice or upon discovery of an encroachment that does not block any portion of the travelled way but is considered to be an imminent threat to public health or safety, the County may remove the encroachment immediately in accordance with MCA.
3. When provided notice or upon discovery of an encroachment that blocks any portion of the traveled way, the County will remove the encroachment immediately in accordance with MCA.
4. If any encroachment is attributable to an individual or group, costs incurred by the County for the removal of the encroachment will be recovered by methods allowed by law.

### **3.2 Mailboxes**

Mailboxes often encroach in the public road right-of-way and are considered an encroachment; however, to accommodate the efficient delivery of mail, an exception is granted, to the encroachment permit requirement, to allow for the installation of a mailbox without a permit as long as the mailbox is installed in substantial compliance with the United States Postal Service (USPS) and County standards. If you are installing a mailbox within the public road right-of-way, please be aware of the following:

1. A mailbox is allowed without a permit as an understood necessity if installed according to the United States Postal Service (USPS) design standards. For a list of the USPS mailbox standards, please see/contact the USPS Postmaster.
2. If an installed mailbox is not in substantial compliance with USPS standards, the owner of the mailbox will be notified and the deficiency must be corrected within fourteen (14) days of the date on the notice. If the deficiency is not corrected within the prescribed time frame, the mailbox will be declared an encroachment and will be removed in accordance with Section 3.1 of these standards. The County may treat mailboxes as an encroachment if the mailbox interferes with the public's safe use of the public road right-of-way or the mailbox hinders the County's ability to maintain the public road right-of-way. The County reserves the right to require the removal of a mailbox, like any other encroachment, if it is a threat to public safety, interfering with maintenance, or a public nuisance.
3. The County is not responsible for the installation, maintenance or replacement of mailboxes within the public road right-of-way, with one exception:
  - a. If a mailbox is damaged by County maintenance equipment and if there is sufficient evidence that any piece of maintenance equipment came into physical contact with the mailbox or post, the County may repair or replace the mailbox or post. Mailboxes replaced by the County will be a standard sized mailbox and post in accordance with USPS standards. No custom-made installations or repairs will be completed by the County.

A mailbox damaged by the force of snow being pushed off the road will not be repaired or replaced by the County.

4. The County will review the installations of cluster mailboxes on a case by case basis and work in cooperation with the USPS to determine suitable locations for mailbox clusters.
5. On collectors and arterials, mail delivery will occur outside the travel way. Where a turnout is used, it shall comply with the requirements for turnouts in Section 4.8. If the shoulder is ten (10') feet wide or more in width, a turnout is not necessary. No turnout may be constructed without approval of the managing road authority. Responsibility for maintenance of the turnout shall be of the rural improvement district, if one exists or is required.
6. If several property owners are served by a local road that intersects an arterial or collector, the mailboxes shall be installed in a turnout off of the local road, rather than off the more heavily traveled arterial/collector.
7. Authority to approve mailboxes rests with the USPS. Mailbox design and support systems shall also meet the crash test requirements of the Federal Highway Administration.

## **SECTION 4. ROAD DESIGN STANDARDS**

### **4.1 General**

Construction of new roads or reconstruction of existing roads in the County shall conform to the standards set forth in this section. Roads must be designed to provide safe and adequate passage for vehicular, pedestrian and non-motorized traffic and ensure proper drainage, including surface crown, culverts, curbs and gutters, drainage swales and storm drains. All applicable standard drawings for County design requirements are available in Appendix C. In case of conflict between these regulations, MPWSS, or AASHTO regarding road standards the order of precedence is as follows:

1. County Public Works Manual
2. AASHTO
3. MPWSS

### **4.2 Road Classification**

The purpose of a functional classification system for county roads is to provide for the safe and efficient movement of people and goods while preserving residential areas and maintaining the economic vitality of commercial and industrial areas. This system classifies transportation facilities according to an appropriate integrated network. It is intended to link land use development activities with transportation facilities for optimum utilization of both. The County's functional classification system is intended to be in compliance with the Federal classification system. Roadways within the county are functionally classified as:

1. Minor Local Road (Gravel): Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 1 - 400.
2. Local Road: Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 401 - 1,500.
3. Minor Collector: Minor collector streets serve the dual functions of distributing traffic between local roads, major collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Minor collector streets typically carry average daily traffic volumes of 1,501 - 3,500 AADT. Minor Collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.
4. Major Collector: Major collector streets serve the dual functions of distributing traffic between local roads, minor collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Major collector streets carry average daily traffic volumes greater than 3,500 AADT. Major

collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.

5. **Arterial:** That part of the roadway system serving as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the City of Helena, East Helena, Lincoln, and Augusta. If an arterial roadway standard is needed, the Montana Department of Transportation (MDT) standards for the appropriate roadway shall be used.

Note: Annual average daily counts (AADT) ranges used in the above functional class descriptions are intended to be used for guidance purposes only. Some local roads and collectors in the County may have traffic counts that are higher or lower than their functional class indicates.

### 4.3 Design Controls & Criteria

1. **Plans for Construction of Roads:** Prior to construction plans and specifications for street and utility construction, designed by a Montana Registered Engineer, must be submitted to the Public Works Department for review and approval. The plans and specifications shall include a vicinity map, a plan and profile, special provisions, reference to the standards specifications, and the typical sections designed to meet the specific project needs and conditions.
  - a. **The Plan:** The 11" x 17" submittal plan shall include: the road alignment at a scale of not less than one (1") inch to one hundred (100') feet showing centerline stationing on all intersecting streets, with bearings on centerlines; curve data on all horizontal curves; right-of-way; relevant topography; existing and proposed utility locations; street names in the development and adjoining the development; typical roadway section showing placement of utilities; existing and proposed drainage and storm water features; sidewalk ramp locations; floodplain and wetland boundaries; signalization, channelization, striping, and signing; and further data as may be required by the County.
  - b. **The Profile:** The profile shall show: the relevant original ground lines using the same stationing as in the plan; control elevations; grade line showing the proposed grades; vertical curves; all bench marks; the vertical datum; and such further information as may be reasonably required. For new roads, the relevant original ground lines will show the ground line at centerline at a minimum and also at the edges of the right-of-way if grade differences are significant (or alternatively surveyed contour lines on the plan view). For existing roads, the Design Engineer shall provide elevations at the edge of the existing pavement or back top of curb, whichever is applicable. The profile lines for roads extending to the perimeter of any development shall be extended a minimum of three

hundred (300') feet beyond the perimeter to include any change in contours, which would affect the profile of the extension of the proposed road.

- c. Special Provisions: Any special technical provisions shall be shown or referenced on the plans and shall be written in accordance with the MPWSS.
  - d. Format: The cover sheet of all plans shall include a statement identifying, which standard specifications will apply to the project. Plan and profile may be shown on the same sheet with profiles shown on the bottom half of the sheet. Submitted sheets shall measure 11" x 17" based on being a true half (1/2) size of a 24" x 36" drawing. The 24" x 36" original (not submitted) drawing shall have a borderline of three-fourths (3/4") inch on the left side of the length of the sheet and one-fourth (1/4") inch on remaining sides, so that the true 11" x 17" drawing is proportioned correctly. When more than two (2) plan sheets are used, an overall development layout shall be submitted showing the relationship of roads and utilities.
  - e. Directional Arrow: A north arrow shall be shown on each plan view sheet and adjacent to any other drawing, which is not, oriented the same as other drawings on the sheet.
  - f. Font Size: Letter size shall not be smaller than eight (8) point type for the submitted 11" x 17" drawing.
  - g. Detail Drawings: All detail drawings, including standard drawings, shall be included.
  - h. Title Block: A title block shall appear on each sheet of the plan set and shall be placed in the lower, right-hand corner of the sheet, across the bottom edge of the sheet or across the right-hand edge of the sheet. The title block shall include the name of the project, the engineering firm, the sheet title, and the owner.
2. Design Criteria: The County Road Design Standards are summarized in Table 4.1 and the following sections. These standards are intended for normal conditions. The County may require higher standards for unusual site conditions.
  3. Changing Grades: Continuous grade changes, or "roller-coastering", shall not be permitted. Grade breaks in lieu of vertical curves are permissible if the algebraic difference in grade (A) does not exceed 1.00%.
  4. Vertical Curves: All vertical curves shall be symmetrical. Refer to Table 4.1 for design criteria.

**Table 4.1 - County Road Design Standards**

<b>Standard</b>	<b>Terrain</b>	<b>Major Collector</b>	<b>Minor Collector</b>	<b>Local Road</b>
Design Speed (MPH)	Level	55	50	30
	Rolling	45	40	25
	Mountainous	45	30	20
Min. Curve Radius at Centerline	Level	Per AASHTO	575	250
	Rolling	Per AASHTO	440	175
	Mountainous	Per AASHTO	300	110
Min. Stopping Sight Distance (ft)	Level	Per AASHTO	425	200
	Rolling	Per AASHTO	305	150
	Mountainous	Per AASHTO	200	110
Max. Grade	Level	Per AASHTO	6%	6%
	Rolling	Per AASHTO	8%	9%
	Mountainous	Per AASHTO	10%	11%
Length of Max. Grade		Per AASHTO	Per AASHTO	Per AASHTO
Minimum Grade		0.5%	0.5%	0.5%
Super Elevation		Per AASHTO	Per AASHTO	Not Allowed
Min. Vertical Curve "K" Value		Per AASHTO	Per AASHTO	Per AASHTO <sup>1</sup>
Min. Road Intersection Spacing (ft)		500	275	150
Min. Driveway Spacing (ft)		45	45	40
Max. Dead End Length (ft)		Not Allowed	Not Allowed	See Section 4.7
Min. Radius of Cul-de-Sac Turn Around (ft)		Not Applicable	Not Applicable	48
Sight Distance Triangle (ft)	Level	300	255	120
	Rolling	210	170	95
	Mountainous	210	120	80
Min. Right-of-Way Width (ft)		100	80	60
Min. Right-of-Way Radius of Cul-de-Sac Turn Around (ft)		N/A	N/A	60
Vertical Clearance (ft)		16.5	16.5	14.5
Intersection Return Radii (ft) with or w/o curb		Per AASHTO	25	15 <sup>2</sup>
Min. Sidewalk Width (ft)		5	5	5
Sidewalk Offset from Back of Curb (ft)		Per AASHTO	Per AASHTO	5
Bike Lane Width (ft)		Per AASHTO	Per AASHTO	Not Applicable
Min. Culvert Diameter (in)		18	15	15
Min. Culvert Cover		Meet or Exceed Supplier Recommendation	Meet or Exceed Supplier Recommendation	Meet or Exceed Supplier Recommendation
Min. Culvert Grade		0.5%	0.5%	0.5%
Culvert Material		Support HL-93 Loading	Support HL-93 Loading	Support HL-93 Loading

See AASHTO Geometric Design of Highways and Streets, most current Edition

<sup>1</sup> The AASHTO Geometric Design of Very Low-Volume Local Roads (VLVLR) may be applied if 25-year ADT projections are below 400 ADT.

<sup>2</sup>Excludes driveway approaches. Refer to section 2.7 for driveway approach requirements.



#### 4.4 Road Surfacing Design Standards

The County provides two (2) methods for road surfacing design utilizing Uniform Design or Engineered Design. These options apply only to the structural section of the road. The profile and section shapes are controlled by the County Road Design Standards. The Uniform Road Design allows for use of a standard County pre-approved road section. The Uniform Road Design is based on new road construction with new materials. Reconstructing or rehabilitating an existing road may require an Engineered Design. Engineered road sections shall be in accordance with the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) *Guide for Design of Pavement Structures (preferred) Asphalt Institute Manual Series No. 1 (MS-1)* or other method. Other methods must be pre-approved by the County prior to undertaking the surfacing design.

1. Uniform Road Design Standards

a. Local Road #1 Uniform Road Design Standard

Table 4.2 depicts the process for developing a Uniform Road Design for a new Local Road #1. If the input parameter is exceeded, the Engineer shall prepare an Engineered Design. As shown in Table 4.2, the limiting criteria for Local Road #1 are the daily number of heavy trucks. If the trucks exceed fifty (50) trips per day on the road, then the road shall be an Engineered Design. In all cases, the designer shall have the option to provide an Engineered Design equivalent for County approval if the designer so chooses not to use a County Uniform Road Design.

**TABLE 4.2 - Uniform Road Design – Local Road #1**

Estimated Daily Number of Heavy Trucks *	Subgrade Condition	Subbase Requirement (inches)
0 to 5	CBR < or= 3	None
	3<CBR<or = 10	None
	CBR > 10	None
6 to 10	CBR < or= 3	6
	3<CBR<or = 10	None
	CBR > 10	None
11 to 25	CBR < or= 3	6
	3<CBR<or = 10	6
	CBR > 10	None
26 to 50	CBR < or= 3	8
	3<CBR<or = 10	6
	CBR > 10	6
Greater Than 50	NA	Note (1)

\* Trucks Classified as FHWA Class 5 or Greater. Class 5 Trucks Are Single Unit Trucks with Two-Axes and Six-Tires

\* Note (1) - Provide an Engineered Design

b. Uniform Road Design Standard for Local Road #2, Minor & Major Collectors

Use of the County's Uniform Road Design Standard for a new Local Road #2, Minor Collector #3, and Major Collector #4 includes determining the road's Equivalent Single Axle Loads (ESALs) for the design (performance period), and an assessment of the subgrade condition.

Local Road #2, Minor Collector #3, and Major Collector #4 as shown in Appendix C will be acceptable for a new road constructed under that classification if the ESALs for the twenty (20) year performance period is one hundred twenty thousand (120,000) or less, and the minimum subgrade CBR is thirteen (13) or greater.

In all cases, the designer shall have the option to provide an Engineered Design equivalent for County approval. If the new road has more than the 120,000 ESALs, or has subgrade CBR values less than thirteen (13), then the Engineer shall provide an Engineered Design.

2. Engineered Road Design Standards These specifications are the County's minimum standards for engineering new or reconstructed road sections. The engineered design must be based on the available material components to build the road, site conditions, and traffic loading.

a. Roadway Typical Sections: The minimum surfacing thickness for paved roads in the County is three (3") inches compacted bituminous surface course, over three (3") inches compacted crushed aggregate surfacing, over six (6") inches compacted crushed based course. The use of existing materials or nonstandard surfacing components must be supported by an engineered surfacing design, and is subject to County approval prior to implementation. If additional depth of surfacing materials is needed to increase subgrade bearing capacity and/or due to higher design ESALs, the shoulder width shall be increased to maintain the proper road surface taper as indicated in Note B of Figures 1 through 4 of Appendix C.

b. Material Components: Table 4.3 summarizes the County's accepted structural coefficients for the material indicated.

**TABLE 4.3 - Surfacing Structural Coefficients of Compacted Material**

New/Virgin Material		Existing Material	
Surfacing Material	Coefficient (Per Inch)	Surfacing Material	Coefficient (Per Inch)
Plant Mix Bituminous Surfacing	0.41	Plant Mix Bituminous Surfacing	0.33
Crushed aggregate surfacing	0.14	Crushed aggregate surfacing	0.12
Crushed based course	0.14	Crushed based course	0.12
Crushed subbase course	0.07-0.14*	Crushed subbase course	0.07
Milled Plant Mix Surfacing	0.12	Milled Plant Mix Surfacing	0.12
Pulverized Plant Mix Surfacing Mixed w/Crushed Base Course	0.12	Pulverized Plant Mix Surfacing Mixed w/ Crushed Base Course	0.12
Treated Crushed based course	0.20	Treated Crushed based course	0.20

\*As determined by designer with appropriate analysis.

Table 4.3 is from the Montana Department of Transportation (MDT) based on material properties evaluated by the MDT Materials Bureau. Actual structural coefficients could vary from those shown in the table due to variations in material quality, compaction or support of the underlying material, position in the surfacing section, etc.

Based on the above, the following are the County's minimum allowable structural numbers for the applicable road classification:

**TABLE 4.4 - New Construction County Road Minimum Structural Numbers**

	A	x B	=
Surfacing Material	Surfacing Thickness (Inches)	Layer* Coefficient (Per Inch)	Structural Number
<b>Local Road #1</b>			
Crushed aggregate surfacing	3	0.14	0.42
Crushed base course	6	0.14	0.84
<b>Overall Structural Number</b>			<b>1.26</b>
<b>All Others</b>			
Plant Mix Asphalt Surfacing	3	0.41	1.23
Crushed aggregate surfacing	3	0.14	0.42
Crushed base course	6	0.14	0.84
<b>Overall Structural Number</b>			<b>2.49</b>

\* Layer Coefficient for new material (i.e. constructing a new road). See Table 4.3.

- c. Site Conditions: For new or reconstructed roads subgrade samples shall be obtained within each mile of road to be constructed, along the intended road centerline for a two (2') foot depth. A minimum of two (2) representative samples shall be obtained. Depending on noticeable changes in roadbed characteristics, additional samples may be required. Each subgrade sample shall be tested to determine the soil's California Bearing Ratio (CBR). These CBR's shall be used to complete the engineered road surfacing design or to assess the Uniform Road surfacing sections chosen. During geotechnical reconnaissance, soil samples for classification should also be obtained below the two (2') foot subgrade sampling area to ascertain changes in conditions. The Engineer must provide the County with a soil sample plan indicating sample locations and depths prior to undertaking the field work.
- d. Traffic Conditions: Traffic volume and the mix of traffic type are combined into an Equivalent Single Axle Load to be applied over the design life of the surface. The Engineer must coordinate with the Public Works Department prior to undertaking design activities. In the absence of accurate truck traffic and vehicle classification counts, the Engineer must coordinate with the Public Works Department on developing an estimated percentage of trucks using the facility as input into the surfacing design parameters.
- e. Miscellaneous Other Input Parameters

**TABLE 4.5 - Surfacing Design Parameters**

Parameter	Local Road #2	Minor Collector #3	Major Collector #4
Performance Period (Design Life)	20 years min.	20 years min.	20 years min.
Initial Serviceability	4.2	4.2	4.2
Terminal Serviceability	2	2.5	2.5
Reliability Level	80	85	90
Overall Standard Deviation	0.45	0.45	0.45

#### 4.5 Typical Roadway Section Requirements

Typical roadway sections shall be developed specific to each project to meet the project's needs based on the minimum requirements, as shown on the Typical Road Section in Figures 1, 2, 3, and 4 in Appendix C, and the minimum requirements shall be detailed on the construction plans submitted for each new roadway or improvement to an existing roadway. All installation of roadway materials shall be completed in accordance with the requirements of the appropriate sections of the latest edition of MPWSS, and shall be certified by a registered engineer as meeting the applicable County road design standards. The required application of an asphalt chip seal coat shall be considered separately from the typical roadway section. An asphalt chip seal coat shall be allowed to be completed and certified by a registered engineer as

meeting the applicable County road design and construction standards at a later date when made part of a subdivision improvements agreement approved by the Commission.

The following requirements shall apply to all roadway structural section elements:

1. Asphalt Chip Seal Coat: When asphalt paving is used as the wearing surface, this item shall consist of a single application of asphalt material on the prepared asphalt surface, followed by spreading seal coat aggregate. The asphalt material and application rates shall meet the requirements of the appropriate sections of the latest edition of MPWSS. The aggregate shall meet the gradation as set forth in Table 4.6 and shall be spread per the rate of the latest addition of MPWSS. All required asphalt chip seal coats must be completed within one (1) year after asphalt paving is completed, or as directed by the County, to allow for proper curing of the asphalt surfacing.

**TABLE 4.6 - SPECIFICATION FOR CHIPS - ASPHALT CHIP SEAL COAT MATERIAL**  
3/8" Asphalt Chip Seal Coat Aggregate

<b>TABLE OF GRADATIONS</b>	
Percentage by Weight Passing Square Mesh Sieves (Montana Test Method MT-202)	
<b>Sieve Size</b>	<b>Grade 2</b>
½" sieve	100%
3/8" sieve	85-100%
#4 sieve	10-30%
#10 sieve	0-10%
#40 sieve	0-2%

- \* The material from which aggregate is to be produced shall have a wear factor not to exceed fifty (50%) percent at five hundred (500) revolutions, as determined by MT-209. The abrasion test shall be run using a five thousand (5000g) gram sample charge material between three-eighths (3/8) inch and #4 sieves and an abrasive charge of eight balls.
- \* At least fifty (50%) percent by weight of the aggregate retained on the #4 sieve shall have at least one mechanically fractured face.

2. Asphalt Paving: This consists of hot plant mix asphalt concrete consisting of mineral aggregate and asphalt material mixed at a central hot plant. The mineral aggregate and asphalt material shall meet the requirements of the appropriate sections of the latest edition of MPWSS.
3. Crushed Aggregate Surfacing on Gravel Roads: This consists of crushed gravel, stone or other similar material consisting of hard, durable particles or fragments of stone, free of excess of flat, elongated, soft or disintegrated pieces, dirt or other deleterious matter. This is the surface course on gravel roads and streets. The material shall meet the gradation as set forth in Table 4.7.

**TABLE 4.7 - SPECIFICATION FOR CRUSHED AGGREGATE SURFACING**  
(Gravel Roads)

<b>TABLE OF GRADATIONS</b>			
Percentages by Weight Passing Square Mesh Sieves			
<b>Passing</b>	<b>1-1/4" Minus</b>	<b>1" Minus</b>	<b>¾" Minus</b>
2" sieve	--		
1 1/4" sieve	100		
1" sieve	--	100	
¾" sieve	70-90	--	100
½" sieve	--	70-80 (± 5%)	--
No. 4 sieve	45-75	40-50 (± 7%)	40-80
No. 10 sieve	25-55	25-40 (± 6%)	25-60
No. 40 sieve	--	15-25 (± 5%)	
No. 200 sieve (not more than)	8-20	8-16	8-20
** Preferred use	Rural Roads	Subdivision Rd	Low Vol/Low Speed

Meet the following requirements for crushed aggregate surfacing, including added binder or blending material:

- \*\* In general, these are the preferred use of these gradations. The Design Engineer must submit gradations for approval.
- \* Dust Ratio: the portion passing the No. 200 sieve cannot exceed two-thirds (2/3) of the portion passing the No. 40 sieve.
- \* The maximum liquid limit for the material passing the No. 40 sieve must not exceed thirty-five (35), while the plasticity index may vary from three (3) to ten (10). A target plasticity index of seven (7) is desirable.
- \* A wear factor not exceeding fifty (50%) percent at five hundred (500) revolutions.
- \* At least twenty (20%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) fractured face.
- \* For the one (1") inch Minus the Table of Gradations establishes target values. During production of the crushed aggregate surfacing, the gradations shall lie within the gradation target values, and the gradation tolerances specified in the Table of Gradations. For example, the No. 4 sieve band (% Passing) is forty to fifty (40-50%) percent. With this example, the QA target value of forty-five (45) has been selected for the No. 4 sieve. The job mix gradation limits would then be forty-five (45), plus and minus seven (7). Therefore, the job mix gradation limits for the No. 4 sieve band production is thirty-eight to fifty-two (38 – 52).

4. Crushed Base Course Under Paved Roads: This consists of crushed gravel, stone or other similar material consisting of hard, durable particles of fragments of stone, free of

excess of flat, elongated soft or disintegrated pieces, dirt or other deleterious matter. This is the layer immediately below the asphalt paving (crushed base course). This material shall meet the gradation as set forth in Table 4.8 for under paved roads (crushed base course).

**TABLE 4.8 - SPECIFICATION FOR CRUSHED BASE COURSE**  
**(Under Paved Roads)**

<b>TABLE OF GRADATIONS</b>			
Percentages by Weight Passing Square Mesh Sieve			
<b>Passing</b>	<b>1 ½" Minus</b>	<b>1" Minus</b>	<b>¾" Minus</b>
2" sieve	--		
1 ½" sieve	100		
1" sieve	--	100	
¾" sieve	--	--	100
½" sieve	--	--	--
No. 4 sieve	25-60	40-70	40-70
No. 10 sieve	--	25-55	25-55
No. 200 sieve (not more than)	0-8	2-10	2-10

- \* A tolerance of five (5%) percent, by weight, up to the next above-specified gradation (1 1/2" for 1" max.) is allowed. The produced material passing the maximum screen opening and retained on the No. 4 sieve shall be reasonably well graded in its grading between those limits within five (5%) percent.
- \* Suitability of the aggregate for its particular use is determined by the final gradation required for grading, as established by the Design Engineer, within the limits allowed in the table for the particular grading specified.
- \* That portion of the fine aggregate passing the No. 200 sieve must be less than sixty (60%) percent of that portion passing the No. 40 sieve.
- \* The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed twenty-five (25), nor the plasticity index exceed six (6), as determined by AASHTO T89 and T90.
- \* At least twenty (20%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) fractured face.

5. **Imported Select Base Course:** This consists of crushed select base course material of hard, durable stone, gravel or other similar materials mixed or blended with sand, stone dust, or other binding or filler materials produced from sources that provide a uniform mixture. The material shall meet the gradation as set forth in Table 4.9.

**TABLE 4.9 - SPECIFICATION FOR SELECT BASE COURSE MATERIAL**

<b>TABLE OF GRADATIONS</b>					
Percentages by Weight Passing Square Mesh Sieve					
<b>Passing</b>	<b>4" Minus</b>	<b>3" Minus</b>	<b>2 ½" Minus</b>	<b>2" Minus</b>	<b>1 ½" Minus</b>
4" sieve	100%				
3" sieve	--	100%			
2½" sieve	--	--	100%		
2" sieve	--	--	--	100%	
1½" sieve	--	--	--	--	100%
No. 4 sieve	25-60%	25-60%	25-60%	25-60%	25-60%
No. 200 sieve (not more than)	2-12%	2-12%	2-12%	2-12%	2-12%

- \* A tolerance of five (5%) percent, by weight, up to the next above-specified gradation (2 1/2" for 2" max.) is allowed. The produced material passing the maximum screen opening and retained on the No. 4 sieve shall be reasonably well graded in its grading between those limits within five (5%) percent.
- \* Suitability of the aggregate for its particular use is determined by the final gradation required for grading, as established by the Engineer, within the limits allowed in the table for the particular grading specified.
- \* The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed twenty-five (25), nor the plasticity index exceed six (6), as determined by AASHTO T89 and T90.
- \* At least twenty (20%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) fractured face.

6. **Subbase Course:** Subbase, if required by subgrade conditions, is the layer of aggregate located immediately below the layer of crushed select base course and on top of the subgrade material. This material shall meet the requirements of Table 4.9, with the exception that the aggregate may be crushed or uncrushed. The depth of this layer of material will be determined by a Uniform Road Design, or an Engineered Road Design, as applicable.

## 4.6 Intersections

Intersections shall be designed to meet the standards provided in Table 4.1 (of these standards). The following additional items shall also be incorporated into design and construction.

1. Roads shall be laid out to intersect at an angle as near to a right angle (ninety (90) degree angle) as practicable, but in no case less than sixty (60) degrees for a local road intersection and no less than seventy-five (75) degrees for a collector road intersection.
2. Intersections shall have a minimum corner radius of fifteen (15') feet along the right-of-way lines of local roads and a minimum corner radius of twenty-five (25') feet at the



right-of-way line at the intersection of collector or arterial roads, unless road improvements require a greater radius.

3. On collector and arterial roads, the dedication of right-of-way on corners shall include the chord of the radius.
4. Intersections on major collector roads and/or arterial roads shall either be aligned or separated by the minimum distance specified in Table 4.1.
5. No more than two (2) streets may intersect at one point.
6. Intersection design shall provide acceptable visibility for traffic safety per the requirements of Table 4.1.
7. Hilltop and swale intersections are discouraged and will not be allowed where adequate sight distance cannot be assured (per Table 4.1).
8. The approaching roadway shall not have a grade exceeding three (3%) percent for fifty (50') feet from the edge of the through roadway, or for twenty (20') feet outside of the through roadways right-of-way line, whichever is a lesser distance.
9. Intersections of local streets with major collector streets or arterial streets shall be kept to a minimum.

#### **4.7 Dead End Roads**

A dead end street shall not be greater than seven hundred (700') feet in length unless the existing or proposed road can meet one of the following two exceptions:

1. Maximum of a one thousand three hundred (1,300') foot dead end length is permitted if:
  - a. The topography of the property is classified as level (slope range of 0 to 8.0 percent);
  - b. The fuel hazard rating for the property is classified as low per an on-site inspection by a recognized fire or fuel management specialist or as indicated on the Wildland Fuel Hazard Rating Map prepared by the Tri-County Fire Working Group for Broadwater, Jefferson, and Lewis and Clark Counties; and
  - c. The dead end road is proposed as part of a future road connection including the extension of a county road easement.
2. Maximum of one thousand (1,000') feet in length is permitted if:
  - a. The topography of the property is classified as rolling (slope range of 8.1 to 15.0 percent);
  - b. The fire hazard rating for the property is classified as low to moderate per an on-site inspection by a recognized fire fuel or fuel management specialist or as indicated on the Wildland Fuel Hazard Rating Map prepared by the Tri-County Fire Working Group for Broadwater, Jefferson and Lewis and Clark Counties; and,

- c. The dead end road is proposed as part of a future road connection including the extension of a county road easement.

The length of a dead end road is measured from the edge of the pavement of the intersecting road to the center of the radius of the cul-de-sac turnaround or to the center of the intersection of the hammerhead turnaround. All dead end roads shall be provided with a cul-de-sac or hammerhead turnaround. A dead end road shall be limited to a length, radius, and right-of-way for the roadway and turnaround as shown in Table 4.1. See Figure 5 in Appendix C for illustrations of acceptable hammerhead turnarounds and cul-de-sacs. The county road easement width for a hammerhead shall be sixty (60') feet.

#### **4.8 Turnouts.**

A turnout is a widening of a travel way of sufficient length and width to allow vehicles to pass one another; to provide an area for mail delivery; to provide an area for transit and school bus users; or to provide an area for the provision of emergency services, such as fire protection. All turnouts shall be constructed of the same material as the roadway that it serves. Turnouts shall be no less than fifty (50') feet long with a minimum travel lane width of ten (10') feet for a minimum length of twenty (20') feet. Turnouts shall be located at least fifty (50') feet from the centerline of the nearest road right-of-way or county road easement.

#### **4.9 Road Certification**

In accordance with the testing requirements in Section 7, the Inspecting Engineer shall certify the roadways are constructed to the approved design plans. Upon completion of the inspection, the Inspecting Engineer shall submit a statement, to the Public Works Department, either certifying that the improvements have been completed in the required manner or listing the defect(s) in those improvements that must be corrected.

#### **4.10 Road Maintenance Policy**

The County will not accept existing or new roadways for maintenance. Roads constructed in new subdivisions will only be maintained by a Rural Improvement District (RID). The RID shall be created concurrently with final subdivision plat approval. The County Special Districts Planner will assist residents in the formation of RIDs to fund maintenance and/or improvements of public road rights-of-way in the County. At a minimum, any RID shall provide for road maintenance, dust control, weed control, and maintenance of turnouts, traffic control signs, and drainage facilities.

#### **4.11 Sidewalks and Non-Motorized Facilities**

Maintenance of sidewalks, trails, non-motorized paths and bicycle paths will not be provided by the County without written approval and development of a separate maintenance funding mechanism, such as an RID.

1. Sidewalks and non-motorized facilities constructed within a public right-of-way or easement shall conform to these standards for construction and to the Americans with Disabilities Act (ADA) guidelines for accessibility. All new sidewalks and non-motorized facilities shall be designed and constructed according to the following guidelines and conditions:
  - a. AASHTO Pedestrian Design Guidelines
  - b. AASHTO Bicycle Design Guidelines
  - c. NACTO Urban Bikeway Design Guidelines
2. Curbside Sidewalk Installations
  - a. All curbside sidewalks shall be constructed of concrete meeting the standards set forth in MPWSS.
  - b. Where a sidewalk in a residential area is adjacent to a curb and gutter installation, the minimum width shall be five (5') feet.
  - c. Where a sidewalk is adjacent to a curb and gutter installation on a collector or arterial street, or is located adjacent to a curb and gutter installation within a commercial or industrial area, the minimum width shall be six (6') feet.
  - d. The minimum thickness of three-quarter (3/4") inch crushed base course material (per Table 4.8 or as directed by the Design Engineer) under a curbside sidewalk shall be a minimum of four (4") inches compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.
  - e. The minimum thickness of concrete shall be a minimum of four (4") inches.
  - f. Geotextile fabric (specified by a Design Engineer or the County) may be required below the gravel crushed base course as directed by the Design Engineer or the County.
3. Boulevard Sidewalk Installations
  - a. All sidewalks with a boulevard between the sidewalk and curb shall be constructed of concrete meeting the standards set forth in MPWSS.
  - b. Where a sidewalk in a residential area is separated from a curb and gutter installation by a boulevard, the minimum sidewalk width shall be five (5') feet and the minimum boulevard width shall be seven (7') feet.
  - c. Where a sidewalk is separated from a curb and gutter installation by a boulevard on a collector or arterial street, or is separated from a curb and gutter installation by a boulevard within a commercial or industrial area, the minimum sidewalk width shall be six (6') feet and the minimum boulevard width shall be ten (10') feet.
  - d. The minimum thickness of three-quarter (3/4") inch crushed base course under a boulevard sidewalk shall be four (4") inches compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.

- e. The minimum thickness of concrete shall be four (4") inches.
- f. Geotextile fabric (specified by Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the Design Engineer.

#### 4. Non-Motorized Facilities

- a. Non-motorized facilities are subject to the standards shown in Table 4.10.
- b. Bicycle lanes shall be provided on streets that are functionally classified as a collector or arterial in locations designated by the County. The design of bicycle lanes shall conform to current AASHTO design standards.
- c. Where non-motorized facilities meet roadways, adequate sight distance shall be maintained.
- d. Bridges for non-motorized facilities shall be approved by the County.
- e. The standard section for a non-motorized facility with asphaltic concrete surfacing shall consist of the following:
  - i. A minimum thickness of two (2") inches of asphaltic concrete compacted to a minimum of ninety-three (93%) percent Theoretical Rice density.
  - ii. A minimum thickness of four (4") inches of three-quarter (3/4") inch crushed base course crushed base course (see Table 4.8) compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.
  - iii. Geotextile fabric (specified by the Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the Design Engineer.
- f. The standard section for a non-motorized facility with crushed aggregate surfacing shall consist of the following:
  - i. A minimum thickness of four (4") inches of three-quarter (3/4") inch crushed aggregate surfacing (per Table 4.8) compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density over an approved sub-base material.
  - ii. The native materials under the surfacing material shall be sterilized with a product approved by the County Weed District.
  - iii. Geotextile fabric (specified by the Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the design engineer.

**TABLE 4.10 - NON-MOTORIZED FACILITIES STANDARDS**

	<b>Class I Core Trail Network</b>	<b>Class II Neighborhood Collector</b>	<b>Class III Low Impact Trail</b>
<b>Surface Width</b>	8' – 10'	4' – 8'	1' – 5'
<b>Vertical Clearance</b>	8'-6"	8'-6"	8'-6"
<b>Recommended Surfaces</b>	Asphalt, concrete, crushed rock	Asphalt, concrete, crushed rock	Crushed rock or native soil
<b>Resting and Passing Space</b>	400'	600'	At trail head

#### 4.12 Signs

All road signs must be designed, constructed, and located according to the standards in the current version of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration.

1. All named roads shall be identified with a sign, which conforms with the MUTCD and with the mounting guidelines contained in Figures 7 and 8 in Appendix C.
2. Street or road signs and traffic control devices shall be placed at all intersections by the Developer or included as part of the subdivision improvements agreement. Traffic control devices and placement shall be consistent with the MUTCD, available from the Public Works Department.
3. Street names must comply with the provisions of the Road Naming Conventions as determined by the City-County Address Coordinator.
4. Whenever possible, name signs shall be placed on the northeast and southwest corners of all intersections. If it is not feasible to utilize the northeast and southwest corners, signs shall be placed so as to be conspicuous to the majority of people.
5. Lettering on street signs shall not be less than six (6") inch capital letters. For local roads with speed limits of 25 MPH or less, the lettering height may be a minimum of four (4") inches.
6. Signs shall have white letters on a dark green reflective background.
7. Name signs shall be mounted not less than five (5') feet nor more than seven (7') feet above the roadway.
8. Depending upon the status of the road and other circumstances, maintenance of road signs may be the responsibility of the County, homeowners associations, RID, or landowners.
9. At least one (1) road name sign shall be mounted at each intersection.

## **4.13 Road Naming and Addressing Standards**

### **1. Road Naming Conventions**

The following are the general conventions for road naming for all unincorporated areas within the County.

- a. Every road with three (3) or more structures shall be given a separate, unique name. For addressing purposes, a structure is defined as a building for occupancy as a residential unit or commercial unit, excluding garages, barns, and sheds.
- b. Each road shall have only one-word names or two-word short names.
- c. A named road shall be essentially continuous, without gaps.
- d. Directional prefixes (north, east, etc.) will only be used when necessary to distinguish the road location relative to the address grid.
- e. All roadways created through subdivision review shall be named by the Developer in accordance with road naming conventions.
- f. All roadways created through certificates of survey shall be named by the landowner in accordance with road naming conventions, with approval of the City-County Address Coordinator (Address Coordinator).
- g. All prospective road names shall be submitted to the Address Coordinator to be checked against existing names. The Address Coordinator shall coordinate with emergency services dispatch with regard to clarity of proposed road names.
- h. No roadway shall be given a name that is currently in use elsewhere in the County. However, some duplication may occur between addressing areas (defined by zip codes, telephone exchanges, planning areas, special districts, etc.) where historical naming conventions have been accepted and provide for facilitated emergency response.
- i. No roadway shall be given a name that sounds the same as another road name currently in use elsewhere in the County, e.g. Diehl and Deal.
- j. Full name street names (e.g., Meriwether Lewis Road) are not allowed. However, upon request, the Commission may consider waiving this requirement for historical reasons.
- k. When renaming roads, the following shall be considered:
  - i. The name of a road or street that has an historical reason for having its name should retain its name.
  - ii. The road with the most properties on it, and thus would require the most effort to coordinate with residents, should retain its name.

- iii. The road that has retained its name for the longest time or has been consistently signed for the longest time should retain its name. The same would be true for a road with the more descriptive name.
- l. All roadways running generally east and west shall use the term road, e.g. Sierra Road.
- m. Roads running generally north and south shall use the term drive, e.g. Green Meadow Drive.
- n. A road running diagonally will be given the term road or drive depending on its general direction.
- o. Additional provisions for naming other types of roads are as follows:
  - i. Way: A north/south road less than one thousand (1,000') feet in length
  - ii. Place: An east/west road less than one thousand (1,000') feet in length
  - iii. Court: Any cul-de-sac with a circle at one end, and less than one thousand three hundred (1,300') feet in length
  - iv. Lane: A meandering roadway less than two thousand five hundred (2,500') feet in length
  - v. Loop: A generally curved road that has an origin and terminus on the same roadway, and which does not contain significant intersections along its route
  - vi. Street: For urban areas, roads running generally north/south
  - vii. Avenue: For urban areas, roads running generally east/west
  - viii. Trail: An existing path or road that was historically named as such
- p. Types of roadways, e.g. road, court, shall not be used to distinguish road names, e.g. Forest Road, Forest Court.
- q. Whenever possible, extensions of roadways crossing jurisdictional boundaries shall use the same name on either side of the boundary, e.g. Montana Avenue in the City and the County.
- r. Extensions of roadways shall be named the same as the road from which they extend.
- s. In some circumstances, roads that are designated State or Federal Highways may be named by that designation, e.g. US Highway 12 West or MT Highway 21.
- t. Otherwise unnamed roads crossing national forests within the County will defer to the designated U.S. Forest Service road name.

## **2. Address Numbers & Plaques**

It is important that address numbers are clearly visible for the efficient provision of delivery and emergency services. The installation and maintenance of address numbers shall be the responsibility of the landowner. Address Numbers and Plaques shall meet the following requirements:

- a. Address plaques shall be installed prior to final plat, or bonded for through a subdivision improvements agreement.
- b. Address plaques shall be posted at the entrance to a property when the structure's address number is not visible from the road.
- c. Address plaques shall conform to the design standards for street identification signs except for color (blue background, white reflective letters).
- d. Address plaques shall be installed in a horizontal or vertical orientation. If installed vertically, the address numbering sequence shall begin at the top.
- e. Procurement of address plaques shall be made through the Community Development and Planning Department.
- f. Lots within a subdivision that are two (2) acres or larger shall be required to have an address plaque.

## **3. Procedures for Naming or Renaming Roads**

- a. Persons wishing to name an unnamed road must present a petition signed by a simple majority of abutting landowners who are in agreement with the prospective name. The petitioner must adhere to the following process:
  - i. Petitioner must present a proof of easement or access via Certificate of Survey to the Community Development and Planning Department for review and approval.
  - ii. Once approved by Community Development and Planning Department, the petitioner must provide plans and road name to Address Coordinator for review. The proposed road name will be reviewed in accordance with subsection 4.13.1 g.
  - iii. After the Address Coordinator approves the road name, notification letters with petition forms are sent to all adjacent landowners for review. A simple majority of landowners must sign and agree to the prospective name. Within four (4) weeks of road name approval, petitions may be sent or presented to the Address Coordinator.
  - iv. If a simple majority of landowners have signed the petition, the new road can be named. The petitioner must contact the Public Works Department to purchase a road sign and schedule installation. Upon



confirmation of payment and installation schedule from the Public Works Department, the Address Coordinator will issue new addresses and notify service providers.

- v. If participation by the property owners is not forthcoming within four (4) weeks, the Address Coordinator will initiate the process to have the road named by the Commission. Once named, the petitioner must contact the Public Works Department to purchase a road sign and schedule installation. Upon confirmation of payment and installation schedule from the Public Works Department, the Address Coordinator will issue updated addresses and notify service providers.
- b. Persons wishing to rename an already-named road must present a petition signed by a simple majority of abutting landowners who are in agreement with the proposed road name change. The petitioner must adhere to the following process:
    - i. Obtain petition from the Community Development and Planning Department or Address Coordinator.
    - ii. The proposed road name shall be reviewed in accordance with subsection 4.13.1 g.
    - iii. After the Address Coordinator approves the name and has verified that a simple majority of landowners have signed the petition, the Address Coordinator shall schedule a public hearing before the Commission for approval of the road name change.
    - iv. Once named, the petitioner must contact the Public Works Department to purchase a road sign and schedule installation. Upon confirmation of payment and installation schedule from the Public Works Department, the Address Coordinator will issue updated addresses and notify service providers.
  - c. The Address Coordinator may assign or re-assign road names to promote an orderly road naming system, and may charge appropriate fees for such services.
  - d. The Address Coordinator will notify the following service providers of new addresses: sheriff, fire department, post office, ambulance service, the Department of Revenue, utility companies, and city/county departments.

#### **4.14 Bridges**

Bridges within the County's jurisdiction, including those in incorporated areas of the County shall be constructed to meet the design requirements of Appendix B and the Floodplain Regulations of Appendix D.

#### **4.15 Cattle Guards**

Cattle guards within the public road right-of-way shall be constructed of non-combustible materials and shall be rated for HS20 loading. Design shall conform to MDT standard cattle guard requirements. All cattle guards require an encroachment agreement per the requirements of Section 3.1.

#### **4.16 County Public Roads and Easement Dedications**

Public road rights-of-way and road dedications must be recorded on a certificate survey, recorded in the County Clerk and Recorder's Office, in accordance with state surveying requirements.

#### **4.17 Grading, Drainage, and Erosion Control**

Standards for all grading and erosion control associated with all road work are as follows:

1. Grading shall not significantly increase the rate of stormwater runoff, and shall avoid the erosion of natural or constructed slopes and sediment accumulation in natural drainage channels or watercourses.
2. Grading shall not significantly alter the natural drainage patterns.
3. Grading shall preserve and conform to the general natural form and contours of the land surface, as much as practically possible.
4. Grading shall be designed to preserve natural or established vegetation as much as is practically possible. The planned revegetation shall stabilize the slope and be compatible with native vegetation. It is suggested (but not required) to use plant material that is native vegetation appropriate to adjacent plant communities in both species composition and spatial distribution patterns. It is recommended that the use of native vegetation acknowledge certain plant species' relative attractiveness to wildlife.
5. Affected site area shall be revegetated as necessary for the stabilization of disturbed surfaces, with the exception of areas covered by impervious surfaces, road shoulders and/or structures.
6. Grading shall allow for the most rapid possible recovery of disturbed lands to natural or introduced vegetation.
7. Any areas disturbed while installing drainage systems shall be restored and revegetated. Where necessary, topsoil shall be placed on disturbed areas prior to revegetation. The proposed restoration plan, which must include a schedule, shall be included as part of all grading and drainage plans submitted to the Public Works Department.
8. The Contractor and all subcontractors shall use the best management practices for road construction and other surface improvements to address erosion control, debris, and dust abatement during construction activities.

#### **4.18 Typical Roadway Section Requirements**

External and internal access roads constructed to the previous County Road Standards (Peccia Typical Sections No. 1, 2, 3, or 4) are grandfathered and acceptable as standard physical access if they meet all of the following criteria:

1. The subject road(s) are certified by an engineer registered in the State of Montana as meeting the original standard. Certification shall include a statement that the road meets the original standard for width, base course, top surfacing, compaction, and drainage. The certification shall include the engineer's stamp; and,
2. No upgrade is needed because of increased annual average daily trips (AADT's) or decreased Level of Service (LOS). If upgrading is required due to these reasons, then the road must meet the County Road Standards of this Public Works Manual.

#### **4.19 Typical Roadway Section Requirements**

Where roads constructed under the previous county roads construction and design standards (Peccia) connect with roads constructed under the current road standards the connection shall integrate the road profiles as seamlessly as possible, including drainage improvements.

#### **4.20 Typical Roadway Section Requirements**

Internal access roads for all major, subsequent minor and first minor subdivisions shall be constructed to the paved standard for local roads. An exemption is allowed from the paving requirement for local roads with between one and four hundred (1-400) annual average daily traffic (AADT) for any subdivision where only residential lots are created and all lots are greater than two and one-half (2 ½) acres in size.



## SECTION 5. EXCAVATIONS WITHIN THE PUBLIC ROAD RIGHT-OF-WAY

Excavations made in any public road right-of-way are subject to the following:

1. Anyone excavating in a public road right-of-way is required to obtain an Excavation Permit from the Public Works Department (an example of an Excavation Permit Application is provided in Appendix A). The Public Works Department will determine the location, number and configuration of all excavations within public road rights-of-way.
2. **UNDERGROUND UTILITY LOCATING CAUTION:** Before any excavations the Permittee is responsible for contacting the Underground Utility Locating Center (One Call Concepts) at 1-800-424-5555 at least two (2) working days before the work is to be performed, or as required by law.
3. **EAST HELENA CAUTION:** Excavations made in any public road right-of-way in the East Helena Superfund Site are subject to the regulations and institutional controls established for this Superfund site. Soil displacement and disposal requires a Soil Displacement Permit from the Lead Education Office ((406) 457-8583).

The East Helena Institutional Controls Program (ICP) is a set of rules and regulations put in place and enforced by the County and the City of East Helena to help ensure the integrity of clean soil and other actions taken to remediate (clean up) contaminants left throughout the East Helena Superfund Site. For additional information about the requirements and regulations, contact Kathy Moore, Division Administrator, at (406) 447-8351.

4. **NORTH VALLEY CAUTION:** If an excavation is set to occur in the North Valley and is in the general area where you could find unexploded ordnance (UXO) from past military training activities, the Permittee is responsible for contacting the Montana Army National Guard (406) 324-3088. Although the chance of actually finding UXO in a public right-of-way is small, be aware that UXO remains in portions of the Helena Valley. Please visit <http://www.mtarnguxoinformation.info/> for detailed information regarding the Montana Army National Guard UXO program. If you have any questions, please contact the UXO office at Fort Harrison at (406) 324-3088.

**WARNING - If you see UXO, do not approach it, touch it, or disturb it in any way! Leave the area immediately. Call 911 to report UXO to authorities. In addition, immediately contact Sundi West - (406) 324-3088 or (406) 431-5955 (after hours).**

### **What to do if you find a UXO: The three R's**

#### **RECOGNIZE**

UXO becomes a danger only when it is disturbed. If you see UXO, STOP!

#### **RETREAT**

Do Not move closer to get a better look! Never attempt to remove anything near it. Do not touch, move, or disturb it. **MOVE AWAY from it.**

## **REPORT**

Call 911 to report suspected UXO.

### **5.1 Excavation Permits**

Excavation permits must be obtained from the Public Works Department for all excavations within the public road right-of-way, except for approach installations, which require an approach permit (see Section 2). All permits issued shall obligate the Permittee to perform said work in accordance with acceptable construction practices, applicable County standards and any conditions placed on the permit. Excavation permits will not be required of persons who are under notice to repair defects under the permit conditions or warranty provisions of a previously issued permit.

### **5.2 Application Fees**

Any person or persons applying for permission to excavate within the public road right-of-way shall pay the current administrative fee in the County fee schedule, for each excavation permit in addition to the maintenance fee. The application fees may be waived by the County for one-time excavations across gravel roads for the purpose of repairing or extending irrigation systems.

### **5.3 Permit Conditions**

Excavation permits issued by the County are subject to the following conditions:

1. Excavation permits shall be assigned an expiration date, determined by the type and extent of work being done.
2. Once the permit has been issued, the Public Works Department shall be notified a minimum of twenty-four (24) hours prior to the commencement of any work. Failure to notify the Public Works Department shall void permit.
3. An adequate Traffic Control Plan shall be submitted prior to starting work and is subject to review and approval by the Public Works Department. The approved Traffic Control Plan shall be strictly adhered to during construction. All necessary signs and devices for construction work zones shall conform to the standards set forth in the MUTCD as published by the U.S. Department of Transportation, Federal Highway Administration.
4. The Permittee must have a valid excavation permit on-site at all times during the excavation.
5. Excavation permits cover a period of fourteen (14) days. All necessary excavation, backfill, surface repair and cleanup shall be completed in a timely fashion and within fourteen (14) days of beginning work unless a time extension has been authorized in writing, in the following circumstances:
  - a. The only remaining item is re-vegetation of the disturbed area;
  - b. Seasonal availability of asphalt for surface restoration; or

- c. Adequate progress is being made toward substantial completion on all open permits.
6. No excavation shall extend over one half of the width of the public road right-of-way at any one time nor shall construction activities block the existing traveled way unless specific written approval has been granted.
7. It shall be the sole responsibility of the Permittee to notify all utilities of the excavation and be responsible for the location of all utility lines and their repair if damaged. Before any excavations, the Permittee is responsible for contacting the Underground Utility Locating Center (One Call Concepts) at 1-800-424-5555 at least two (2) working days before the work is to be performed, or as required by law.
8. County is not responsible for costs associated with any utility installation or cost for removal/relocation.

#### **5.4 Survey Monumentation**

Reasonable efforts shall be made to protect and avoid damage to existing survey monuments within the excavation area. Any survey monument in danger of disturbance shall be referenced by a professional land surveyor to facilitate the replacement of that monument should disturbance occur. Any survey monument which is disturbed shall be reset or replaced by a professional land surveyor, and it is the responsibility of the disturbing party to provide and pay for those services.

#### **5.5 Cutting of Surface Material**

When the excavation requires cutting concrete, asphalt or other hard surface, the following conditions shall apply:

1. When conditions allow, horizontal boring is preferred to open excavations.
2. All concrete areas to be excavated, including curb and gutter, sidewalks, driveways and slabs shall be cut with a power driven saw to a minimum depth of twenty (20%) percent of its total thickness then broken square and removed. Cut limits will be a minimum of one (1') foot beyond the proposed excavation limits.
3. Asphaltic concrete surface or hard roads shall be cut utilizing a power saw. On a case by case basis in older pavements, the County may allow the asphalt to be cut using a jackhammer with spade bit or with a cutting wheel mounted on power equipment. Square cutting shall produce a smooth vertical face at a minimum distance of one (1') foot beyond the area disturbed by excavation.
4. Cuts shall be rectangular and made parallel and perpendicular to the traveled way of the road. The County reserves the right to extend the cut area to eliminate pavement "slivers" along the edge of the road or near appurtenances.

## **5.6 Excavation of Surface and Base Material**

All excavations shall follow current OSHA guidelines and disturb only the minimum of surface area necessary to complete the work, but provide adequate safety for workers and allow for acceptable compaction of backfill material. Undercutting of the surface, base, sub-base, and sub-grade materials will not be allowed. All excavations greater than twenty (20') feet shall require an engineered design as per OSHA regulations. Permittee shall submit plans to the County for review and concurrence per Section 5.13.

## **5.7 Backfilling**

When backfilling an excavation within a public road right-of-way, the following conditions apply:

1. All backfill material shall be free from organic matter, refuse, frozen material, saturated material, pieces of concrete and asphalt, boulders or other materials not suitable for use as fill material.
2. Materials used for backfill shall be carefully placed in layers suitable to the equipment used for compaction, and each layer shall be brought to optimum moisture content ( $\pm 3\%$ ) and mechanically compacted to a minimum of ninety-five (95%) percent of ASTM D-698 standard proctor density.
3. Material containing a moisture content higher than that which will allow for acceptable compaction shall be removed, hauled away, and replaced with suitable backfill material. If the native material can efficiently be mechanically processed on-site to meet the County requirements as defined herein, it may be used as backfill material. If the proposed drying process cannot be completed within the time limit prescribed by the County (to be determined by site conditions, including consideration for public convenience and safety), the material shall be removed and replaced. Water flooding and/or compaction will not be allowed, unless specific written permission has been obtained prior to its use.
4. Backfill around the facility being placed or repaired shall be adequate to provide the necessary support and protection to ensure the public road right-of-way is not re-opened because of the lack of proper bedding material.
5. Suitable material removed from the excavation may be used for backfill from the top of the bedding material to sub-grade level.
6. From the top of the bedding material to sub-grade level, material containing stones up to eight (8") inches in the greatest dimension may be used.
7. Mechanically fractured washed rock between three-eighths ( $3/8$ ") inch and two (2") inches may be used as backfill material where standard compaction techniques and equipment cannot be used, subject to prior approval by the County.
8. Flowable fill conforming to MPWSS specifications may be used, subject to prior approval by the County.



9. If the County is unsatisfied with the materials, compaction techniques or efforts, work shall be stopped and an independent testing firm will verify compaction at the Contractor's expense.

## 5.8 Surface Replacement

After an excavation has been backfilled, the following conditions shall apply for surface replacement:

1. Where excavation and construction work takes place on unimproved surfaces outside of the roadway template, the area shall be returned to its original condition immediately after the work is complete. This will include topsoil replacement, reseeding to natural grass and returning drain ditches to grade.
2. Where excavation and construction work take place on asphalt or hard surfaced roads, it is desirable to replace the pavement section to its original or better condition after excavation work. To accomplish this goal, the following conditions shall be met:

- a. There shall be a minimum of eight (6") inches of three (3") inch minus crushed subbase course (as per Table 4.9) and three (3") inches of one (1") inch minus crushed base course gravel (as per Table 4.8) placed on the prepared sub-grade material. All sub-grade, crushed subbase and crushed base materials shall be brought to optimum moisture content ( $\pm 3\%$ ) and compacted to a minimum of ninety-five (95%) percent of the standard proctor density as determined by ASTM D-698, or otherwise directed by the County.

Depending on conditions and road classification, the County may require geogrid, geotextile fabric, increased aggregate sections, or an increased asphalt section, in either single elements or any combination thereof as directed by County or the Engineer.

- b. The square cut edges of all exposed asphalt shall have a tack coat applied prior to placement of a minimum of three (3") inches of hot mix asphaltic concrete compacted to ninety-three (93%) percent of the Rice density, or otherwise directed by the County.
- c. Asphaltic concrete shall be placed in such a manner leaving no noticeable bump or depression after the replacement is complete.
- d. Asphaltic cold mix or a concrete slurry mix may be used as a temporary surface patch. This temporary repair shall be removed and replaced with compacted hot mix asphaltic concrete as soon as weather conditions and hot-mix asphalt availability allow.
- e. If the finished surface replacement does not meet reasonable expectations of the approved plans or excavation permit, the County retains the right to require seal coating to restore original surface conditions.

3. Where excavation and construction work take place on gravel surfaced roads, the gravel surface replacement shall comply with County specifications.
4. Any hard surface road that is considered a chip sealed road shall comply with Section 5.8.2.

## **5.9 Concrete Replacement**

All concrete areas excavated, including curb and gutter, sidewalks, driveways, and slabs shall be replaced to the same dimension, shape and grade as original condition or to current standards, as directed by the County. Concrete shall be locally available ready-mix concrete with a twenty-eight (28) day compressive strength of four thousand (4,000) psi minimum unless otherwise approved by the County.

### **5.10 Clean Up**

All materials, debris, and items relating to the excavation or construction work shall be removed from the site and if required, pavement surfaces shall be swept. In all respects the site and surrounding area shall be in an equal or better condition than prior to the work being accomplished.

### **5.11 Warranty**

All work and materials used under this permit shall be warranted for a period of two (2) years following acceptance. Should there be any settling from any portion of the work or defect in materials or workmanship it shall be promptly corrected at no cost to the County. The County assumes no responsibility for Permittee's work or damage to adjacent private property. The County requires the repair or construction be equal or better than existing conditions and meet minimum County standards.

### **5.12 Bonding and Insurance**

1. The County requires that all applicants for excavation permits be covered by a Surety Bond and Liability Insurance when working within the public road right-of-way. The County shall be listed as an additional insured.
2. Prior to starting work within the public road right-of-way, the Permittee shall file or have in effect a Surety Bond in the following amounts:
  - a. Not less than fifty thousand (\$50,000) dollars for Public Utility Companies.
  - b. Not less than twenty thousand (\$20,000) dollars for General Contractors.
  - c. One hundred and twenty-five (125%) percent of the contract amount for engineered projects.
3. The bond shall be conditioned upon the proper installation or repair of the facility, proper backfill of the excavation and proper restoration of the surface in accordance with these standards. Said bond shall remain in full force for the duration of the

warranty period. The bond amount may be reduced by the County for one-time excavations.

4. Full Comprehensive General Liability Insurance coverage shall be in effect for the duration of the work. This coverage shall provide for both bodily injury and property damage as follows:
  - a. Bodily injury portion shall include coverage for injury, sickness or disease and death arising directly or indirectly out of or in connection with the performance of work under this permit and shall provide for a limit of not less than seven hundred and fifty thousand (\$750,000.00) dollars for all damages arising in bodily injury, sickness or disease or death of one person and a total limit of one million five hundred thousand (\$1,500,000.00) dollars for damages arising out of bodily injury, sickness or disease and death of two or more persons in any one occurrence.
  - b. Property Damage portion will provide for a limit of not less than that listed below for all damages arising out of damage to or destruction of property of others arising directly or indirectly out of or in connection with the performance of work under this permit in any one occurrence including explosion, collapse and underground exposure.
    - i. Automobile – one hundred thousand (\$100,000.00) dollars
    - ii. Other than automobile – one hundred thousand (\$100,000.00) dollars each occurrence, three hundred thousand (\$300,000.00) dollars aggregate
  - c. Indemnity portion shall hold harmless, indemnify and defend the County, the Public Works Director, and their employees and agents from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work under this permit.
  - d. The bonding and insurance requirements may be waived by the County for one-time excavations across gravel roads for the purpose of repairing or extending irrigation systems, provided that the excavator has in effect a valid homeowners, ranch, or farm general liability insurance policy at the same limits described above.

### **5.13 Assessment for Opening Hard Surfaces**

A charge of five dollars (\$5.00) per square foot separate from the excavation permit must be paid by the Permittee for each square foot of hard surfacing less than two (2) years old to be removed. Revenue from this assessment shall be credited to the general road fund. This charge may be waived at the discretion of the County, whenever the pavement to be opened is the result of the need to repair broken utilities or other special circumstances.

## **5.14 Public Utility Companies**

1. Any public utility owning or operating a system of distribution lines for electric power, natural or artificial gas, telephone, fiber optics, cable television, sewer or water service or as otherwise recognized by the County, shall not be required to obtain a permit for each excavation. The utility shall notify and coordinate with the Public Works Department a minimum of two (2) weeks prior to the excavation activity.
2. Utility companies shall be governed by the full provisions of these standards except for Sections 5.1, 5.2, 5.3, 5.12, and 5.13. It is recognized that continual maintenance of utility facilities is necessary and that reasonable operation in making excavations to restore or maintain service will be allowed under emergency conditions. The Public Works Department shall be notified as soon as practical in these cases.
3. Utility facilities shall be located to minimize conflicts and avoid the need for future adjustments. Where right-of-way width and terrain features permit, all utilities shall be located outside of the roadway cross section and at or near public road right-of-way limits. Hardship cases may necessitate placement of the facility within the roadway cross section, but ample justification must be provided. New facilities or a major revision of existing facilities will require review in regard to location by the County to avoid potential conflict prior to the permit being granted for placement.
4. The County reserves the right to require the utility to change the location or to remove any structures, lines or pipes at any time in order for the County to perform any needed work on or in the right-of-way as per statute. Any change, relocation or removal shall be made at the sole expense of the utility.

## **5.15 Penalties**

Noncompliance with these standards shall be subject to the following penalties.

1. First offense of an unauthorized excavation shall not be penalized but will be documented and the offender notified by the County.
2. Second offense of an unauthorized excavation will result in a penalty of two times (2x) the cost of the excavation permit.
3. Third offense shall result in a five hundred (\$500) dollar penalty.
4. All further offenses, at the discretion of the County, may result in removal of all utilities and infrastructure from the public road right-of-way at the sole expense of the utility or installer.

## **SECTION 6. TRAFFIC CONTROL**

The use of all traffic control devices is based on the current edition of the following publications:

- Manual on Uniform Traffic Control Devices (MUTCD);
- AASHTO Roadside Design Guide;
- AASHTO A Policy on Geometric Designs of Highways and Streets;
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals; and
- American Traffic Safety Services Association (ATSSA) guidelines.

Before installing any sign posts, the Underground Utility Locating Center (One Call Concepts) must be contacted at 1-800-424-5555 at least two (2) working days before the work is to be performed.

### **6.1 Temporary Traffic Control**

Any work proposed within a public road right-of-way that requires a Traffic Control Plan (TCP) will not be approved until the TCP has been approved by the Public Works Department. Any TCP that is submitted is subject to the following conditions:

1. The plan may be represented and referenced appropriately as a Typical Application defined in the most recent edition of the MUTCD.
2. The Contractor is responsible for the set-up, maintenance and removal of the signage or devices.
3. The Contractor shall use signs and devices that are clear in meaning, are located appropriately and are clean and legible.
4. When the work is complete, the Contractor shall remove all traffic control signs and devices within forty-eight (48) hours. If the signs and devices are not removed within forty-eight (48) hours, the Public Works Department will remove them and the Permittee will be responsible for reimbursing the Public Works Department for costs incurred.
5. No work may begin until all traffic control devices are in place. If work is being conducted without appropriate signage in place, the Public Works Department will suspend the work and/or any appropriate permits until the proper traffic control devices are in place.

### **6.2 Permanent Traffic Control**

1. When a proposed project involves removing, relocating, or replacing existing traffic control devices, or when installing new traffic control devices, a signage plan is required. The Contractor has the option of installing the sign(s) or paying the Public Works Department to complete the work.

2. In any subdivision that creates new roads that approach an existing road public right-of-way, the Developer has the option of installing the sign(s) or paying the Public Works Department to complete the work.
3. If a Contractor or Developer requests that the County install permanent signage, payment shall be received prior to the work being completed.
4. If a Contractor or Developer installs signage, the signs shall be installed according to the following regulations:
  - a. All proposed signage must be approved by the Public Works Department prior to any installations. If the signage is not installed in compliance with the plans, the Developer or Contractor shall be required to reinstall, relocate, or replace any deficient signage.
  - b. Street signs shall be visible from both directions, either with a double-sided sign mounted on top of the post or two single-sided signs mounted on each side of the post.
  - c. All signs installed will be in compliance with MUTCD requirements

### **6.3 Pavement Markings**

Markings on highways open to public travel have important functions in providing guidance and information for the road user. Major marking types include pavement and curb markings, delineators, colored pavements, channelizing devices, and islands. In some cases, markings are used to supplement other traffic control devices such as signs, signals, and other markings. In other instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not obtainable by the use of other devices.

Markings have limitations. Visibility of the markings can be limited by snow, debris, and water on or adjacent to the markings. Marking durability is affected by material characteristics, traffic volumes, weather, and location. However, under most highway conditions, markings provide important information while allowing minimal diversion of attention from the roadway.

Applications of all pavement markings are based on standards from the most recent edition of the MUTCD. Prior to the application of any pavement marking, construction plans must be submitted to the Public Works Department for approval. Materials applied to paved road surfaces shall be readily available, durable commercial products designed for use on road surfaces. Application methods and equipment shall be those recommended by the product's manufacturer.

## **SECTION 7. CONSTRUCTION TESTING AND CERTIFICATION**

The Public Works Department has developed a Road Review Process which outlines the design and construction approval processes. The intention of this process is to help clarify for an Applicant/Developer what the Public Works Department is looking for during their review and approval of work done within public road rights-of-way.

The design and construction checklist in Appendix E helps simplify design criteria and material testing required by both the County Public Works Manual and the Montana Public Works Standard Specifications. The Applicant/Developer will have a much clearer understanding, up front, as to what is expected during the design and construction review and approval processes.

In order to better document the inspection and certification of public infrastructure improvements, the Public Works Department shall require electronic copies of all documentation prior to final acceptance of road improvements within the public road right-of-way within the County's jurisdiction; and all costs associated with the required testing and certifications and any peer reviews deemed necessary by the Public Works Department staff to verify submitted results are the sole responsibility of the Applicant/Developer or Permittee.

### **7.1 Engineer's Certification of Construction to County Standards**

1. The Engineer shall submit a letter to the County certifying that all applicable improvements were installed in accordance with the approved plans and specifications. The required as-built drawings shall be scalable 24 inch x 36 inch or 11 inch x 17 inch, as appropriate for the size of the project, with one (1) digital CADD copy.
2. At a minimum, the Engineer shall furnish documentation of tests in accordance with methods prescribed by AASHTO, ASTM or MPWSS and as stated in Appendix E, for theoretical maximum density, optimum moisture content and sieve analysis for the surfacing material on gravel roads, the imported sub-base material, base material and excavation backfill material within the public road rights-of-way. The existing base/sub-base material within the rights-of-way shall be field density tested until the material meets ninety-five (95%) percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix E, when the material is at or near optimum moisture content. This information may be required for all construction work completed within the public road rights-of-way at the discretion of the Public Works Department.

### **7.2 Documentation of Density Tests**

At a minimum, the Engineer shall furnish documentation of in-place field density tests. In-place density tests for trenches and embankments shall, at a minimum, be required for the first lift of backfill to set a pattern of compaction and shall be provided daily and as backfill material changes. In-place density tests for roadways shall, at a minimum, be required at intervals defined in Appendix E. Tests for roadways shall be provided for sub-grade, sub-base, imported base, and other aggregate coarse. At a minimum, the top six (6") inches of native sub-grade which will be under a structural section shall be field density tested until the material meets

ninety-five (95%) percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix E. All trench backfill material in improved areas and all embankments shall be compacted for the fill depth and shall be compacted to ninety-five (95%) percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix E. This information shall be required for all construction within public road rights-of-way.

### **7.3 Documentation of Asphalt Job Mix Testing**

At a minimum, the Engineer shall furnish a dated job mix formula for hot mix bituminous asphaltic concrete which conforms to the procedures of the Asphalt Institute's MS-2 Manual. The job mix formula shall be no older than one (1) year, and shall have the same aggregate and asphalt sources and grades as the mix used for public improvements. The Engineer shall furnish certified results of a Marshall Test showing the bulk specific gravity determination, stability and flow data and density and void analysis. (See construction and testing checklist in Appendix E.)

### **7.4 Documentation of Asphalt Core Samples**

At a minimum, the Engineer shall furnish test results of asphalt core samples for bituminous pavement for applicable construction within public road rights-of-way. One set of two (2), four (4") inch diameter minimum core sample shall be required for every one thousand (1000) tons of bituminous pavement with a minimum of two (2) samples per project or as directed by the Engineer, and/or approved by Public Works. The Engineer shall provide a certified laboratory report from the samples taken as to thickness and actual density. This information shall be required for applicable construction within public road rights-of-way. (See construction and testing checklist in Appendix E.)

1. See Section 6.6 MPWSS for (asphalt) mat density requirements. Verification of maximum density as determined by ASTM D2041 from plant produced material during production may be required.
2. The field density and thickness of the pavement is determined by measuring the cores tested. The actual thickness must be no less than one-quarter (1/4") inch under the specified thickness from the approved plans. Asphalt that does not meet thickness requirements shall be overlaid the entire width of the roadway in even station increments. Transitions for any required overlays shall be milled in to the existing asphalt.

### **7.5 Documentation of Concrete Testing**

At a minimum, the Engineer shall furnish test results of Portland cement concrete tests for concrete placed in the public road rights-of-way and concrete incorporated into public infrastructure improvements. One set of tests taken by an approved ACI certified concrete technician shall be required for every fifty (50) cubic yards of concrete placed with a minimum of one (1) set of tests per project. The concrete shall be sampled in the field and specimens made and compliance determined in accordance with the following:



Sampling Fresh Concrete	ASTM C-172
Slump	ASTM C-143 or AASHTO T119
Air Content	ASTM C-231 or C-173 or C-138 or AASHTO T152, T196 & T199
Compressive Strength	ASTM C-39 or AASHTO T22
Making and Curing Test	ASTM C-31 or AASHTO T23

## **7.6 Checklist for Documentation of Testing and Inspections**

A full checklist of the items that are required to be submitted to the Public Works Department and those items that will be inspected and approved by the Public Works Department can be found in Appendix E.

See Montana Public Works Standard Specification (MPWSS), Sixth Edition, Section 03310 regarding testing frequency, and specific requirements for structural concrete.



## **SECTION 8. CONSTRUCTION ACTIVITY CONDITIONS**

During any construction activity that is subject to approval and inspection by the County, the following conditions shall be met:

1. All construction activity is subject to the permit and fee requirements as set forth in these standards.
2. Whenever permit authorization is required from the Montana DEQ, a copy of approved permit shall be submitted to the Public Works Department prior to issuance of construction approval.
3. While disturbed areas of one (1) acre or greater require permit authorization from the Montana DEQ, regardless of the disturbed area, erosion control Best Management Practices (BMP's) for all construction activity shall be submitted to the County as part of the construction plan submittal. During construction, the BMP's shall be used and maintained at all times by the Contractor. Once active construction activity has been completed, any temporary BMP's shall be removed and the area reclaimed. Where long-term BMP's are employed after construction activity is substantially complete, their installation shall be completed within fourteen (14) days of direction by the County. Long term BMP's shall be maintained by the Contractor for a period of one (1) year or until vegetation has been established over eighty-five (85%) percent of the disturbed area, whichever is longer.
4. It is the Contractor's responsibility to remove all material tracked from a construction site onto the abutting road, whether public or private. If a Contractor does not remove material tracked onto a public road as needed, on a scheduled interval or at the direction of the County, the County will remove the tracked material and the Contractor will be liable for the costs incurred. If the Contractor fails to reimburse the County for the costs incurred, said costs will be recovered by any method allowed by law.
5. Vehicles, equipment or materials shall not block or impede the travel way or any non-motorized facilities. If any such item is located within a public road right-of-way and is deemed by the County to be a nuisance or a threat to public safety, the item(s) will be considered an encroachment and removed from the right-of-way as allowed by law.



## **SECTION 9. TRAFFIC ENGINEERING ANALYSES**

### **9.1 Traffic Impact Studies**

Traffic Impact Studies, as described in this Manual, are intended to determine the need for any improvements to the adjacent and nearby transportation network in order to ensure that a proposed development does not adversely affect the transportation network; identify any traffic problems related to a development; to develop solutions to potential problems; and present improvements to be included in a proposed development. A sample Traffic Impact Study outline is included in Appendix G and is based upon the current editions of Institute of Transportation Engineers (ITE) standards and the Highway Capacity Manual.

### **9.2 Preliminary Engineering Reports (PERs)**

1. A preliminary engineering report (PER) may be prepared as an initial task to analyze the deficiencies of a road located in public road right-of-way. By evaluating a road or segment of a road's structural and geometric deficiencies or needs, and obtaining an initial snapshot of what improvements are necessary to meet or exceed County Road Standards, the County can better identify funding requirements, and begin subsequent planning for engineering and construction. A sample PER outline is included in Appendix G.
2. A PER, prepared and certified by an engineer licensed in the State of Montana, shall provide estimated costs of improvements necessary to make a road or segment of road meet or exceed the County Road Design Standards (Section 4). The PER shall describe the existing and proposed conditions within the traffic impact corridor to the extent necessary so that all components can be quantified and assigned an estimated cost. Estimated costs shall include the following:
  - a. Estimated preliminary and final engineering costs including, but not limited to, design plans and specifications, material testing during construction, inspection and administration;
  - b. Estimated costs of obtaining and completing necessary permits;
  - c. Estimated surveying costs;
  - d. Estimated right-of-way acquisition costs;
  - e. Estimated utility relocation costs;
  - f. Estimated costs for geotechnical and miscellaneous design related site testing and laboratory analysis;
  - g. Estimated costs for road construction/improvements including materials, turning lanes, horizontal alignment and vertical grade adjustments, construction staking, temporary and permanent erosion control, road subgrade stabilization including geotextiles and subbase, sidewalks, curb and gutter, topsoil salvage and replacement, revegetation, weed management, traffic signals, signal timing

changes, temporary traffic control, traffic control, approaches, bridges, guardrails, signage and/or pavement markings, non-motorized facilities, provisions for storm water drainage, and contingencies to bring the facility into compliance to these regulations; and

- h. Estimated costs for any other items necessary to improve the road.
3. Estimated costs shall not be older than six months at the time of final plat application. The burden of proof for estimated costs is the responsibility of the Developer. Estimated costs must be prepared and certified by an engineer licensed in the State of Montana. Estimated costs shall be submitted to the Public Works Department for review and recommendation. The governing body may, at the Developer's expense, require a third party, designated by the governing body, to review estimated costs as described in the PER.

## **SECTION 10. DUST ABATEMENT**

Any individual who wishes to apply a dust palliative on a County maintained road shall be required to obtain a permit from the Public Works Department. Permits issued by the Public Works Department are subject to the following conditions.

1. If the Public Works Department provides road surface preparation (grading), the Public Works Department will notify the Permittee when grading is complete. The permit will be void three (3) days after the Department gives notice to apply the dust suppressant.
2. It is the Applicator's responsibility to apply the dust palliative in a manner which minimizes the impact on adjacent property, natural resources and the traveling public. The Applicator shall comply with all applicable federal, state and local legislation and regulations which apply. These include, but are not limited to, water quality, waste disposal and hazardous materials disposal requirements.
3. The Permittee shall be responsible for any damage to public or private property caused by the application of the dust palliative.
4. If the above conditions are not met, the Public Works Department may refuse to issue a permit or suspend a permit already issued.
5. The Public Works Department reserves the right to maintain public road rights-of-way at any time road conditions deteriorate in the best interest of the traveling public even if such action will diminish or destroy the effect of a dust treatment.
6. The following guidelines have been developed by the Public Works Department to assist individuals with the application of dust palliatives:
  - a. Used oil MAY NOT be used as a dust suppressant on any public road as per state law.
  - b. The Applicator shall use equipment and practices which distribute the dust palliative evenly over the road surface.
  - c. Dust palliatives shall not be applied when measurable precipitation is forecast at greater than thirty (30%) percent chance within the following twenty-four (24) hours by the National Weather Service.
  - d. Applicators of dust palliatives shall not apply dust control materials in a location where they are likely to contaminate water sources. This includes streams, river, ponds, irrigation ditches and creeks. The possibility of contamination from both over-spray and run-off should be closely monitored.
  - e. The Public Works Department reserves the right to restrict or ban the application of any material that it determines may be deleterious to property, water, animal and plant life, or that is a public nuisance.





## SECTION 11. SPEED LIMIT REQUESTS AND REVISIONS

If a public road in the County's jurisdiction does not have an ordinance for a speed limit, speed limits shall follow Section 61-8-310, MCA. The following is the general procedure to request a speed limit revision:

1. If required by statute, a request in writing must be submitted to the Public Works Department, located on 3402 Cooney Drive, Helena, MT, 59602. There is no set language for the request, but the typical language for the top of the request would read something like the following:

***"We, the undersigned, request that a speed limit be placed on " \_\_\_\_\_ Road"***

*(at this point the request needs to specify the road name and section – i.e. "X Road" from the intersection with "Y Road" to the intersection with "Z Road" or the entire length) for the following reasons: (i.e. poor sight distance, road width, safety, etc.).*

*Every signer must include his or her address, phone number and signature.*

2. Once the request is submitted, the County will review the request and determine if a speed limit study is warranted. Once this determination has been made a speed study will be conducted as set forth in Section 61-8-310, MCA, to determine the safest and most appropriate limit to be posted.
3. The County will draft a proposed ordinance and provide public notice as per Section 7-1-2121, MCA, and place it on a public meeting agenda. The proposed ordinance will be read at two separate public meetings. The County suggests at least one person be willing to speak at the public meetings in support of the newly requested speed limit.
4. Following the second reading and approval of the proposed ordinance and a protest period of thirty (30) days, the speed limit goes into effect and is punishable by law. The County will post speed limit signs after the thirty (30) day waiting period.

You may contact the Public Works Department at (406) 447-8037 or (406) 447-8031, if you have any questions or need additional information.



## **SECTION 12. WEIGHT RESTRICTIONS ON COUNTY ROADS AND BRIDGES**

In the interest of preserving the integrity of a County public road or bridge and pursuant to Sections 7-14-2101 and 7-14-2102 MCA, the Commission may authorize the Public Works Department to post appropriate temporary or permanent weight restrictions on any public road or bridge under the County's jurisdiction through the adoption of an Ordinance or a Resolution. Enforcement of these restrictions is conducted by the Lewis & Clark County Sheriff's Office and the Montana Department of Transportation, Motor Carrier Services Division, with penalties as prescribed in Sections 61-10-141 through 61-10-147 MCA.

### **12.1 Road Restrictions**

Seasonal load restrictions are often necessary to prevent surface damage to hard surfaced or gravel roads. The County will place load restrictions for single axle and tandem axle weights based upon pounds per inch width of tire limits on roads vulnerable to distress. The County will place load restrictions only when necessary and lift the limits as soon as possible.

In the order of severity, the following types of restrictions to be imposed on County public road rights-of-way are:

1. Where the public road surfaces for the entire route are adequate to carry legal loads, the County may place a reduced speed limit on those sections that show distress.
2. Where the public road surface is susceptible to damage from heavy loads, load limits will be imposed for the entire section of a public road. The limitation will be eight (8) tons single axle and sixteen (16) ton tandem axle (400 pounds per inch width of tire) and a reduced speed limit may be placed through distressed areas.
3. Where the County determines the public road surface is particularly susceptible to extensive damage from heavy loads, or where surface damage cannot be controlled by less restrictive limits, then the limitation will be seven (7) tons single axle and fourteen (14) tons tandem axle (350 pounds per inch width of tire) and a reduced speed limit may be placed through distressed areas.
4. **Exception:** The County recognizes the need for essential services, such as the supply of propane or heating oil and the pick-up of solid waste. Overweight permits with identified restrictions may be issued to these service providers by the County and the Montana Department of Transportation that will allow service to continue.

### **12.2 Bridge Restrictions**

In accordance with County Bridge Standards in Appendix B, permanent load restrictions may be necessary for County bridges that are not capable of carrying legal highway loads. If it is determined that a posted weight restriction is necessary, the County will post the restriction at the Inventory Rating. The Inventory Rating is the limit at which repeated loads may safely cross the structure without causing damage. The Operating Rating is the limit where larger loads

may cross the structure at very infrequent intervals without causing damage and is the governing factor for the issuance of overweight permits as related to County bridges.

### **SECTION 13. PARKING RESTRICTIONS**

As provided in Section 61-8-355(4), MCA, the County has the authority and responsibility to place official traffic control devices prohibiting or restricting the stopping, standing, or parking of vehicles on a highway where in its judgment this stopping, standing, or parking is dangerous to those using the highway or where stopping, standing, or parking unduly interferes with the free movement of traffic.

1. The Public Works Director shall have authority to determine where conditions warrant the placement of traffic control devices to limit stopping, standing, or parking of vehicles in all public road rights-of-way under its jurisdiction.
2. For any location that the Public Works Director determines a need to place traffic control devices limiting stopping, standing, or parking vehicles, they shall prepare a written report documenting the conditions leading to their conclusion that such stopping, standing, or parking is dangerous to those using the highway or unduly interferes with those using the highway.
3. The Public Works Director shall, bi-annually, prepare a list of all locations where stopping, standing, or parking vehicles is restricted. The Public Works Director will present the list to the Commission at a public meeting along with reports for any newly posted locations as to the reasons for their addition.
4. All traffic control devices installed to limit stopping, standing, or parking in a public right-of-way shall contain a reference to Section 61-8-355 (4), MCA, and Section 13 of the County Public Works Manual.



## **SECTION 14. SEEDING AND WEED MANAGEMENT**

Pursuant to Section 7-22-2121, MCA (County Weed Control), anyone significantly disturbing soil must submit a written weed management and re-vegetation plan to the County Weed District for review and approval per the requirements of Appendix F. All requirements and specifications of an approved plan must be met prior to commencing any road construction project, during construction, and after construction.





## **SECTION 15. APPEAL PROCEDURE**

This appeal procedure is established for anyone wishing to depart from the requirements set forth in this Manual or those decisions of County staff authorized by this Manual. The appeal should be in writing, signed by Applicant/Owner/Entity or affected party, and should contain, but is not limited to, the following information:

1. The name, address, and phone number of the person filing the appeal;
2. A description of the problem, detailing site-specific restrictions and why they are requesting relief from denial of a permit or conditions of a permit, or an enforcement action and suggested solution;
3. The location and site information to support their appeal; and
4. A copy of the original application and conditions.

The appeal must be submitted within thirty (30) calendar days of receiving notice of specific applicable conditions or a denied application. Appeals shall be submitted to the Secretary for the Board of County Commissioners, 316 N. Park Ave. Rm. 345, Helena, MT 59623.

After receiving an appeal, the Commission will schedule a public hearing. At least five (5) days prior to the hearing date, the Commission shall send notice of the hearing to the Applicant. At the hearing, the Applicant has the burden of proof by preponderance of the evidence and shall first present evidence. The County staff shall then present its evidence. The Applicant may then present rebuttal evidence. The Commission must make a decision affirming, modifying, or overturning the decision of County staff. The Commission shall notify the Applicant of the decision, in writing, within thirty (30) working days following its decision.



# Appendices



# Appendix A

## Permits





# LEWIS AND CLARK COUNTY PUBLIC WORKS DEPARTMENT

## ROAD APPROACH PERMIT APPLICATION INSTRUCTIONS

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1. Applicant shall complete the attached Road Approach Permit Application. The application **MUST** include a sketch indicating the desired location of the approach. A copy of the Certificate of Survey (COS) may be substituted for the sketch with the desired location indicated. **Incomplete applications will be returned.**
2. Applicant shall submit the completed application and pay the application fee of \$150 to the Community Development and Planning Department, Room 230; 316 N. Park Ave., Helena, MT 59623. **If the approach has been installed without a permit, the fee is \$500.**
3. When the completed application and fee have been submitted, the Applicant will receive a flag to place at the desired location of the approach. The Applicant must contact Community Development & Planning at (406) 447-8374 once the flag has been placed in the appropriate location.
4. County Staff will inspect the desired approach location and provide comments and installation conditions that will be indicated on the Approach Permit.
5. The application will then be returned to Community Development & Planning indicating all of the required conditions for installation of the approach.
6. The Applicant will receive notification from Community Development & Planning requesting the Applicant come to Room 230, sign the Approach Permit and pick up a copy of the permit with identified conditions for proper installation. **Failure to install the approach within 12 months from the date of the signed Approach Permit invalidates the permit.**
7. Public Works staff will schedule an inspection thirty (30) days after issuance of the approach permit. If there is a need for postponement of the inspection per construction delays, the Applicant shall contact the Public Works Department at (406) 447-8040 to reschedule the final inspection once the approach has been properly installed. **Failure to notify Public Works and the resulting need for multiple inspections will result in the Applicant being assessed an additional permit fee.**

The process to complete the initial inspections and return the permit to the Community Development and Planning office typically requires ten (10) working days, so Applicants should anticipate and factor this processing time into their construction schedule.

**CONSTRUCTION CANNOT BEGIN ON THE APPROACH UNTIL APPLICANT HAS SIGNED THE APPROACH PERMIT.**

## **PUBLIC WORKS GUIDELINES AND STANDARDS FOR INSTALLATION OF AN APPROACH**

All approaches will be installed in accordance with the current version of the Lewis and Clark County Public Works Manual. Approaches onto any public road are subject to these requirements and any additional conditions on the permit:

### **1. Construction Costs**

The Permittee and Applicant shall do all work and pay all costs associated with the construction of the approach and any appurtenances on the public road.

### **2. Construction to be done by a Contractor Certified by County Public Works**

Design and construction of an approach requires understanding of drainage functions, safety considerations and sound construction practices requiring that contractors have requisite knowledge and experience to install them in compliance with the County standards. The County has instituted a contractor certification process similar to that required for septic system installers, many of whom do approach installations. Approach permits will only be issued to contractors that have been certified by the Public Works Department as having received the requisite training and who operate according to County requirements for approach installations.

### **3. Maintenance**

Any maintenance and/or repairs deemed necessary by the Public Works Department shall be the responsibility of the Permittee/Property Owner(s). The Department reserves the right to make any changes within the public road right-of-way that may be necessary to provide proper protection and safety for the public or maintenance of the public road right-of-way.

### **4. Indemnification**

The Permittee/Property Owner(s) shall hold harmless and indemnify the County and its duly appointed agents and employees against any action for personal injury or property damage sustained by reason of the exercise of the permit.

### **5. Penalty/Enforcement**

If the Public Works Department determines that an approach is not in substantial compliance with these standards, the Permittee/Property Owner(s) of the approach will be notified and allowed to correct the deficiency. If the deficiency is not addressed within ten (10) working days, either by corrective action or by notifying the Public Works Department of a proposal for corrective action, the Department will determine the approach to be an encroachment and will take appropriate action to remedy the situation in accordance with

7-14-2134 through 7-14-2138 MCA.

### **6. Covenants, Zoning and Other Restrictions**

An approach permit shall not be granted unless it complies with covenants, zoning, storm water drainage plans, subdivision conditions, institutional controls, and any other restrictions associated with the property. Review of such potential restrictions as well as looking at the proposed approach location for special drainage and/or safety conditions has led to the typical ten (10) day application review time frame.

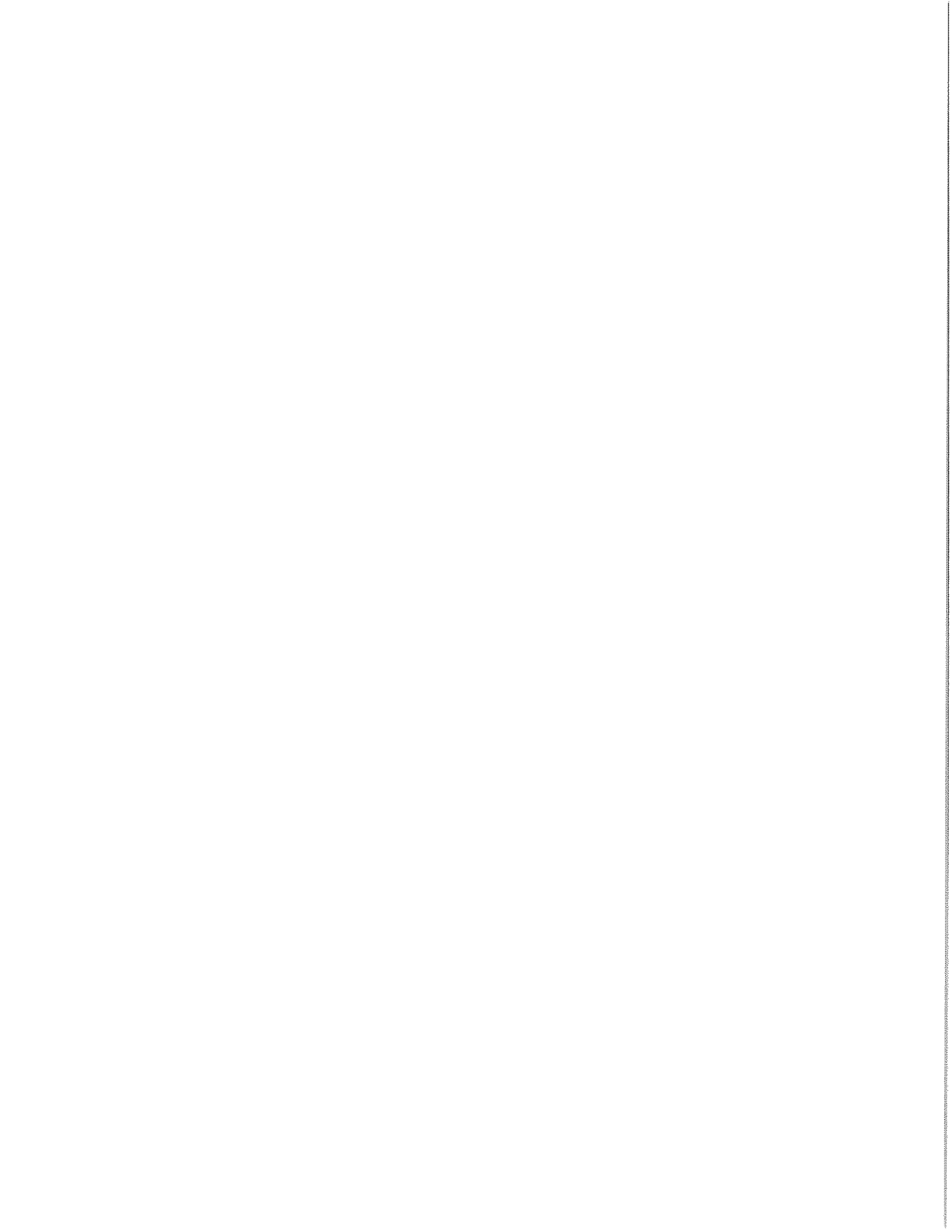


## **7.Modification Process**

The policies, procedures, guidelines and standards contained in the current version of the Public Works Manual are to be used for the uniformity of all approaches and work done in public road right-of-ways. As the policies, procedures, guidelines and standards change within the Public Works Department, these requirements will change.

## **8.Appeal Procedure**

Section 15 of the Public Works Manual outlines the appeal procedure for deviation from the installation guidelines, conditions or requirements for installation of an approach onto a public road right-of-way.





# LEWIS AND CLARK COUNTY PUBLIC WORKS DEPARTMENT

## ROAD APPROACH PERMIT APPLICATION

Application for work to be performed in the public road including approaches, culverts and other drainage improvements. Please submit application to: Attn: Community Development & Planning, 316 N. Park, Room 230 Helena, MT 59623 (406) 447-8374.

**FEE:** \$150.00 in advance, \$500.00 if permit obtained after approach installation. Make checks payable to: Lewis & Clark County

Check One:  Contractor  Property Owner

Check One:  Application for Approach onto County Road and Culvert Placement  
 Application for Culvert Placement and Drainage Improvements ONLY

**APPROACH TO BE INSTALLED BY A CERTIFIED INSTALLER**  
**CERTIFIED INSTALLER:**  
**Name Printed** \_\_\_\_\_  
**Certification Number** \_\_\_\_\_

Applicant Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Primary Telephone Number: \_\_\_\_\_ Secondary: \_\_\_\_\_

Property Owner Name: \_\_\_\_\_

Approach Location Address (must include sketch and flag marking location): \_\_\_\_\_

GEO CODE: \_\_\_\_\_ Certificate of Survey No. (if applicable): \_\_\_\_\_

Lot#: \_\_\_\_\_ Subdivision Name (if applicable): \_\_\_\_\_

General Location (i.e., distance from nearest road or intersection): \_\_\_\_\_

Proposed Approach will be located on the \_\_\_\_\_ (N, S, E, W) side of roadway.

What is the intended use for the approach? \_\_\_\_\_

Are there other approaches near the proposed location? (circle one): YES NO

If Yes, please explain and show on attached sketch: \_\_\_\_\_

Is this approach pre-existing? (circle one): YES NO If yes, please explain: \_\_\_\_\_

What is the desired width of the proposed approach (in feet)? \_\_\_\_\_

Desired Installation Date: \_\_\_\_\_

**(Initial review of an approach permit may take two (2) weeks)**

**SKETCH OF APPROACH LOCATION**

Application will not be accepted without a sketch and attached location map.  
See instructions below.



**Don't Forget to Place a Flag!**

Sketch, or attach a sketch, showing the general location of the proposed approach, property boundaries, roads and their names, drainages and topographic features affecting the proposed location. For informational purposes please provide: indicate the approximate distances to the nearest adjacent existing approaches on both sides of the road rights-of-way, location map (i.e. aerial photo, google map or similar) and any other pertinent information that shows the location of proposed approach.

Applicant agrees to mark location of proposed approach with a flag placed in the center of the proposed location. Inspection will not take place until flag is placed and the Permit Coordinator is notified. **Flags are available from Community Development & Planning, Room 230.**

Applicant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**TO BE COMPLETED BY COUNTY STAFF**

**PLANNING**

**DEPARTMENT:** \_\_\_\_\_

\_\_\_\_\_

Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

**PUBLIC WORKS**

**DEPARTMENT:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Drainage Improvements Required(circle one):      YES      NO

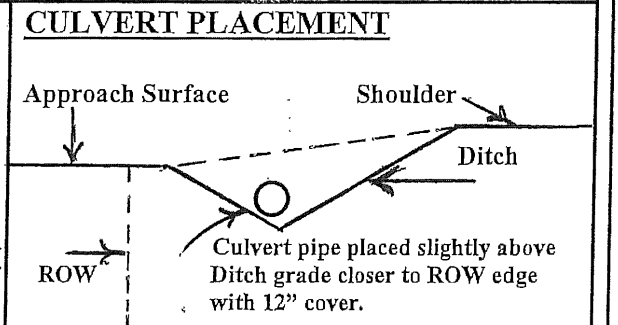
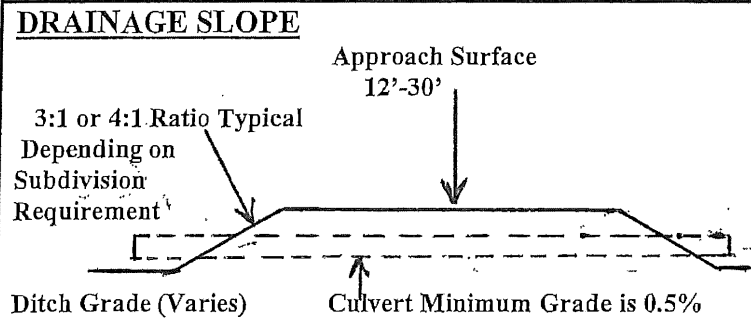
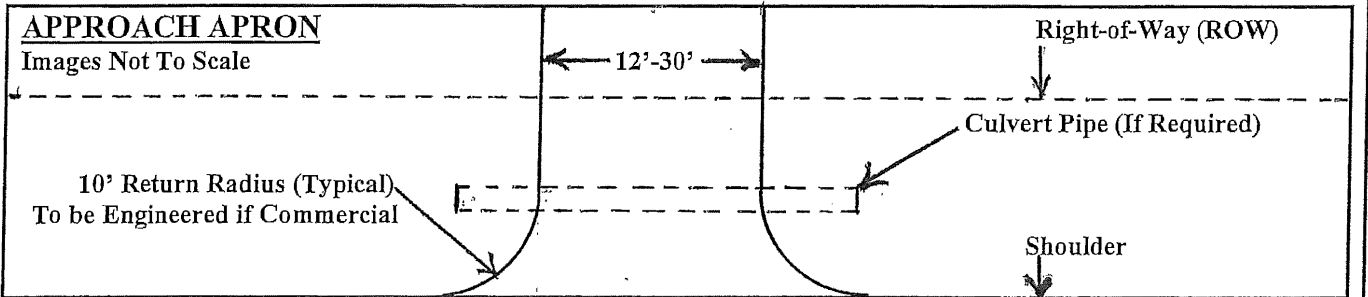
Culvert Type: \_\_\_\_\_ Diameter (inches): \_\_\_\_\_ Length (feet): \_\_\_\_\_

**NOTE:** An asphalt or concrete apron shall be required from the edge of roadway to R.O.W. for driveways accessing a hard-surfaced arterial, collector, or minor collector.

Comments: \_\_\_\_\_

\_\_\_\_\_

Review By: \_\_\_\_\_ Date: \_\_\_\_\_



By signing this condition report, the applicant and the property owner accept the conditions required for this permit and to abide by them. Applicant or property owner agrees to contact Public Works (406-447-8040) for inspection after installation. Any failure to comply with the conditions of this application by the applicant or the property owner may result in the revocation of the permit and the removal of the approach from County right-of-way.

Applicant Signature \_\_\_\_\_ Date: \_\_\_\_\_

Property Owner's  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**COUNTY APPROACH PERMIT INSPECTION REPORT**

ALL APPLICANTS WILL BE CONTACTED AFTER INSPECTION IS COMPLETE

**(TO BE COMPLETED BY STAFF ONLY)**

DATE PERMIT COORDINATOR NOTIFIED APPLICANT THAT THE CONDITIONS REPORT IS READY FOR PICK UP: \_\_\_\_\_

DATE APPLICANT NOTIFIED PUBLIC WORKS THAT INSTALLATION WAS COMPLETE: \_\_\_\_\_

IS THE APPROACH INSTALLED PER THE ATTACHED COUNTY APPROACH PERMIT CONDITIONS REPORT? (circle one)

YES                  NO

IF NO, EXPLAIN...

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

INSTALLATION INSPECTION BY: \_\_\_\_\_

DATE: \_\_\_\_\_

DATE APPLICANT WAS CONTACTED AFTER INSPECTION: \_\_\_\_\_



# LEWIS AND CLARK COUNTY PUBLIC WORKS DEPARTMENT

## APPLICATION FOR CONTRACT AND ENCROACHMENT AGREEMENT

City-County Building, 316 North Park Avenue, Helena MT 59623 (406) 447-8374

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**FEE: \$150.00**      **Make checks payable to Lewis and Clark County**  
**(2 times normal fee for after the fact)**

**NAME:** \_\_\_\_\_

**MAILING ADDRESS:** \_\_\_\_\_

**TELEPHONE NUMBER:** \_\_\_\_\_

1. County owns/has jurisdiction over, certain property in Lewis and Clark County, Montana, described as:

\_\_\_\_\_  
\_\_\_\_\_

2. Owner owns certain property in Lewis and Clark County described as:

\_\_\_\_\_  
\_\_\_\_\_

3. In order for Owner to more fully enjoy his property as described above, Owner has requested an Encroachment Permit from the County to allow Owner to install or maintain the following-described property and/or appurtenance(s):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### GENERAL INFORMATION TO APPLICANT:

4. By issuance of an Encroachment Agreement, the County will agree to allow Owner to install or maintain the property and/or appurtenances described in paragraph 3, above, on the property described in paragraph 1, above.
5. The parties agree that when Owner's property, the installation and/or maintenance is hereby authorized, is destroyed or worn out, said property or appurtenances shall not

be repaired or replaced without express written consent of the County. Further, said property or appurtenances shall be operated and maintained pursuant to the direction of the County.

6. Owner will agree that he is gaining no additional rights over the property by execution of this agreement.
7. Owner will further agree and promise that the installation and/or maintenance of the property or appurtenances, shall not interfere with the use by the County of the property above described. If owner's property does interfere with the County's use of the property, County may cancel this agreement by giving Owner sixty (60) days written notice of County's intent to cancel the contract. At the expiration of said sixty (60) days, Owner shall remove at his own expense all of his property and/or appurtenances, the installation and/or maintenance of which is authorized by this agreement.
8. Further, Owner will agree to hold the County, its' agents, officers, and employees, harmless from any costs, liability, expense or damage, of any kind, in any way arising out of the location of Owner's property on the property as authorized by this agreement.

FOR OWNER:

BY: \_\_\_\_\_

Encroachment Agreement applications must include a Comprehensive Permit Application (CPA) form, a copy of the current survey for the parcel, a copy of the current deed, a copy of any covenants on the property as well as a diagram or encroachment survey showing the encroachment.

Updated 011409





# LEWIS AND CLARK COUNTY

## Office of the Permit Coordinator

City County Administration Building  
316 N. Park Room 443  
Helena, Mt 59623  
(406) 447-8392

### Right-Of-Way Excavation Permit

**FEE: \$\$\$\$00 Make check payable to: Lewis and Clark County**

(All lines must be completed)

Date: \_\_\_\_\_

Name of Applicant: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone #: \_\_\_\_\_

Contractor performing work: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

24-Hour Phone #(s): \_\_\_\_\_

### LOCATION OF WORK ON RIGHT-OF-WAY

Name of Road: \_\_\_\_\_

Legal Description \_\_\_\_ 1/4 \_\_\_\_ 1/4 \_\_\_\_ 1/4 Section \_\_\_\_ Township \_\_\_\_ N Range \_\_\_\_ W

General location of Excavation: \_\_\_\_\_

\_\_\_\_\_

Purpose of the Excavation: \_\_\_\_\_

Dimensions of the Excavation: Width \_\_\_\_\_ Length \_\_\_\_\_ Depth \_\_\_\_\_

To what extent will this excavation interfere with the normal flow of traffic on streets, or public ways? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

What procedures will be taken to maintain traffic safety? (Must follow *Manual on Uniform Traffic Control Devices*) \_\_\_\_\_

\_\_\_\_\_

- The applicant must notify the County Road Foreman Twenty-four (24) hours in advance before any work is started.
- All signage shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).
- Where excavation and construction takes place on unimproved surfaces outside the roadway template, the area shall be returned to its original condition immediately after work is complete. This will include topsoil replacement, reseeding to natural grass, and returning drain ditches to grade.
- On the Reverse side of this form or on an attached sheet, furnish a plat, map or sketch showing the location of the excavation, its depth, width and length, edge of asphalt if any, centerline of street, north arrow and scale of the drawing.
- Applicant is required to consult utility companies operating in this area before marking and excavating. In granting this permit, Lewis and Clark County makes no representation as to the location of utility facilities in the area to be excavated or the effect of the permitted excavation on said utilities.
- In consideration for the granting of an excavation permit by Lewis and Clark County, the above named applicant hereby agrees (1) to perform the excavation applied for in a professional manner and in conformity with ordinances of Lewis and Clark County; and (2) to save harmless Lewis and Clark County, its officers, agents, employees from any and all costs, damages and liabilities which may accrue or be claimed to accrue by reason of any work performed under a permit issued pursuant to this application.

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Date

All applicants must submit proof of insurance (attach copy).

All applicants will be subject to a five (5) day waiting period after the application has been submitted and signed.

Permission is hereby granted for the above named applicant to excavate as described in the above application and as amended below.

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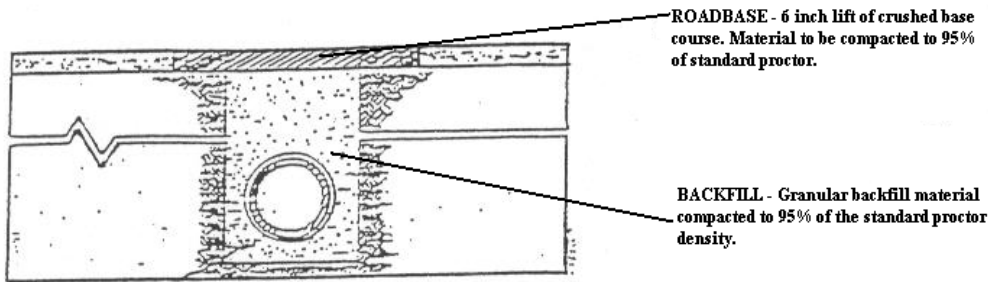
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By: \_\_\_\_\_  
County Road Manager

\_\_\_\_\_ Date

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**Roadway Excavation Requirements for Non-Paved Roads:**



**BACKFILLING OF EXCAVATED AREAS BENEATH ROADWAY SECTION**

Utility construction which lies beneath the construction limits of the roadway which requires backfilling of excavated areas shall be subject to inspection by the Lewis and Clark County Road Forman, or his designee (hereinafter referred to as Department), and shall meet the following specifications. The Department shall designate the specific area(s) where these requirements shall apply.

**BACKFILLING**

All backfilling shall meet the following requirements except when other methods are specified for certain types of installations.

1. Backfill material shall not contain sticks, sod, frozen soil or other unacceptable matter.
2. Backfill material shall be placed in layers of six-inch loose thickness or less.
3. All backfill material shall be compacted.

**MOISTURE AND DENSITY REQUIREMENTS**

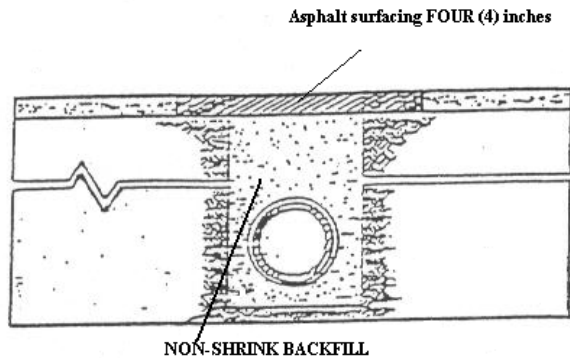
Each layer of material shall be compacted, with proper use of water, until the in-place density of the material being compacted is not less the 95% of the maximum density established for the material being compacted or the material source or both. Water required shall be sufficient to obtain optimum moisture content plus or minus 2% points, as determined by the Montana Test Methods, unless modified by the Department for conditions applicable to the character of the material being tested.

Material tests used to establish the maximum density values will be performed in accordance with the Montana Test

Method MT-210, or ASSHTO-T-99. In-place density and moisture testing will be performed in accordance with applicable Montana Test Methods MT-212, MT 215, & MT-218. The percent compaction will be determined after making proper adjustments, when necessary, for oversize material.

Each layer of roadbed material that cannot be properly tested by the above methods shall be compacted with compaction equipment in addition to compaction by hauling and spreading equipment. Compaction equipment for rocky material that cannot be tested shall normally be grid rollers, pneumatic tired rollers, vibrating rollers, vibrating compactors, or self-propelled tamping rollers. Sheepsfoot rollers shall not be used unless specifically directed. Water shall be used where directed.

**Roadway Excavation Requirements for Paved Roads**  
**(Horizontal boring is the preferred method when possible)**



**NON-SHRINK BACKFILL MIX:**

<u>Ingredients</u>	<u>Weight/C.Y.</u>
Cement - 0.45 sack	42 lbs.
Water - 39 gallons	325 lbs.
Air (entrapped) 1.5 %	
Course Aggregate (1" max.- size 57)	1700 lbs.
Sand (ASTM C-33)	1845 lbs.
<b>TOTAL WEIGHT:</b>	<b>3912 lbs.</b>

Specifications for:  
**NON-SHRINK BACKFILL (SLURRY)**

NON-SHRINK BACKFILL is to be used in ALL paved sections of Lewis and Clark County road right-of-way.

NON-SHRINK BACKFILL shall be poured to within FOUR (4) inches of the asphalt surfacing; and, shall be allowed to set a minimum of THREE (3) hours prior to placing asphalt.

If the asphalt is not placed the same day, then SLURRY shall be poured to the top of the asphalt. The SLURRY then must be allowed a minimum of THREE (3) hours curing time prior to permitting traffic on the SLURRY. Prior to placing the asphalt surfacing, the FOUR (4) inches of SLURRY mix shall be removed, and the existing pavement shall be square cut to a minimum of ONE (1) foot beyond the trench line.

Asphalt edges shall be treated with a TACK COAT prior to placing the permanent asphalt patch.

A minimum of FOUR (4) inches of HOT asphalt shall be used for the permanent patch. COLD mix asphalt may be used as a temporary patch until HOT mix asphalt is available.



**LEWIS AND CLARK COUNTY**  
**DUST CONTROL PERMIT AND AGREEMENT**  
**ON A COUNTY ROAD**

**IT IS IMPORTANT FOR YOU TO NOTE** that, for purposes of this application, the term “County Road: is defined as any road under the jurisdiction of Lewis and Clark County”.

Please place a check next to the box which best describes your purpose for making application to Lewis and Clark County.

Private application of dust control on  
County Road

Request road grading prior to application of dust  
control

Please type or print legibly.

Applicant Name: \_\_\_\_\_  
Last First

Mailing Address: \_\_\_\_\_  
Street or P.O. Box City State Zip

Telephone: \_\_\_\_\_  
Home Work Cellular

Dust Control  
Address: \_\_\_\_\_  
Road Name City Subdivision Name

General Location: \_\_\_\_\_  
(i.e. “West side of Valley Drive approximately ¼ mile north of the intersection with Canyon Ferry Road”)

Name of dust suppressant product and method of application to be used:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Planned Completion Date

PLEASE NOTE: Montana state law prohibits the use of used motor oil as a dust suppressant on any public road. A list of the currently approved dust suppressant products is available from the Montana State Department of Environmental Quality, Waste Management Division. The permittee must ensure that the dust suppressant and application thereof are in conformance with all applicable state laws. If the County provides road surface preparation (grading) the County will notify the applicant when the grading is complete. This permit will be void if dust treatment is not applied within three (3) days after the County gives notice to apply the dust suppressant.

**Subject to the following terms and conditions. The permit applied for is hereby granted.**

**PERMIT TERM.** This permit shall be in full force and effect from the date hereof until revoked as herein provided. This permit may be revoked by the County, for just cause, upon giving 45 days notice to Permittee by ordinary mail, sent to the address shown herein. However, the County may revoke this permit without notice if Permittee violates any of its conditions or terms.

**COMMENCEMENT OF WORK.** No work will be started until Permittee notifies the Public Works Department of the date the Permittee proposes to commence work.

**COUNTY SAVED HARMLESS FROM CLAIMS.** As a consideration of being issued this permit, the Permittee, its successors or assigns, agrees to protect Lewis and Clark County and save it harmless from all claims, actions or damage of every kind and description which may accrue to, or be suffered by, any person or persons, corporations or property by reason of the performance of any such work, character of materials used, or manner of application, or by the improper occupancy of said highway right-of-way, and in case any suit or action is brought against the County and arising out of, or by reason of, any of the above causes, the Permittee, its successors or assigns, will, upon notice to them of the commencement of such action, defend the same at its sole cost and expense and satisfy any judgment which may be rendered against the County in any such suit or action.

**PROTECTION OF TRAFFIC.** The permittee shall protect the work area with traffic control devices that comply with the Manual of Uniform Traffic Control Devices. The permittee may be required to submit a traffic control plan to the County for approval prior to starting work. During work, the County or designee may require the permittee to use additional traffic control devices to protect traffic or the work area. No road closure shall occur without prior approval from the County.

**COUNTY'S RIGHT NOT TO BE INTERFERED WITH.** All authorized work shall be done by Permittee so as to cause the least interference with any of the County's work, and the County shall not be liable for any damage to the Permittee by reason of any such work by the County, its agents, contractors or representatives, or by the exercise of any rights by the County upon the roadways from the application of dust control authorized under this permit. If County roadway changes necessitate construction, alteration, repair, maintenance or improvement of the County roadway, the County shall not be held liable for disturbances of the dust suppressant applied under this permit.

The undersigned "Permittee" agrees to the terms and conditions of this permit.

**PERMITTEE ACCEPTANCE**

**LEWIS AND CLARK COUNTY  
APPROVAL**

\_\_\_\_\_  
(Signature) (Date)

\_\_\_\_\_  
(Signature) (Date)

INFORMATIONAL SHEET FOR INDIVIDUALS PETITIONING THE.  
BOARD OF COUNTY COMMISSIONERS FOR ROAD ADJUSTMENT

MCA 7-14-2601. "Any 10, or a majority of a road district taxable therein for road purposes may petition the board in writing to open, establish, construct, change, abandon, or discontinue any county road in the district."

Prior to submitting a petition a pre-application conference must be scheduled with the Permit Coordinator.

The petition must set forth the following:

1. The specific section of the road to be established, altered or abandoned;
2. The adjacent lands and owners;
3. Other affected lands and owners;
4. Whether the landowners, who can be found, consent to the road adjustment;
5. The probable cost of the right-of way; and
6. The purpose for and the advantage of establishing, altering or abandoning the road.

Before acting upon this petition, notice must be published in the paper and a sign will be posted near the requested road adjustment. Notice will be mailed to the applicant and adjacent property owners. Road adjustments are the sole responsibility of the Board, and the cost associated with these notifications will be charged against the \$300\* fee which is required when a petition is submitted.

A member of the Board of County Commissioners, a Public Works employee and a County Planner shall review the request within 30 days of receiving the petition.

\* Please contact the County Community Development and Planning Office for a current fee schedule.





**PEITION TO ESTABLISH, ALTER OR ABANDON A COUNTY ROAD EASEMENT**

We, the undersigned, being freeholders of Lewis and Clark County, and acting under the provisions of §7-14-2601 and 7-14-2602, MCA, hereby petition the Lewis and Clark County Board of Commissioners to

- Establish                       Alter                       Abandon

a county road easement generally located:

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1. The specific section of the county road easement to be (established, altered and/or abandoned) is: (Attach map, "Exhibit A", showing the specific section of the county road easement.)

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2. The adjacent lands and owners are: (Provide a list of lots and owners)

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3. Other affected lands and owners are: (Provide a list of the lots and owners)

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4. Do the landowners, who can be found, consent to the road adjustment? \_\_\_\_\_ Yes \_\_\_\_\_ No  
Explain who can be found and if they consent, and who cannot be found: \_\_\_\_\_

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5. The probable cost of the right-of-way is, if necessary: \_\_\_\_\_

6. The necessity for and advantage of (establishing, altering and/or abandoning) the road is:

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# LEWIS AND CLARK COUNTY PUBLIC WORKS DEPARTMENT

## ROAD ADJUSTMENT APPLICATION

City-County Building, 316 North Park Avenue, Helena MT 59623 (406) 447-8374

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**A copy of the Comprehensive Permitting Application (CPA) and Road Adjustment Petition must be attached. Please attach additional information as necessary.**

1. **Applicant:** \_\_\_\_\_ **Phone: (primary)** \_\_\_\_\_ **(secondary)** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

(If Applicant is an entity, i.e. corporation, identify an individual to receive all related communication and provide documentation that said individual has been granted legal authority to execute documents on behalf of the entity.)

\_\_\_\_\_

2. **Surveyor:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

3. **Engineer:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

### 4. Proposed Road Adjustment

Road Adjustment Type (check one):

Establish                       Alter                       Abandon

Road Name: \_\_\_\_\_

Road Location (general): \_\_\_\_\_

\_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4, Section\_\_\_\_, Township\_\_\_\_, Range\_\_\_\_,

5. **What is the road classified as (i.e. county road easement, private easement, public access easement, etc.)? Attach documentation.** \_\_\_\_\_

6. **Describe the purpose for the road adjustment request:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. **Describe the physical characteristics of the road, include topography, vegetation, slope, streams, natural drainages, and the current surrounding land uses: Attach additional pages as necessary.**

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8. **Is the road part of a Subdivision?** \_\_\_\_\_ Yes \_\_\_\_\_ No If yes, attach certificate of survey and existing covenants.

9. **Is the road part of an existing Rural Improvement District(s) (RID)?**  
\_\_\_\_\_ Yes \_\_\_\_\_ No If yes, identify: \_\_\_\_\_  
\_\_\_\_\_

10. **Are there any existing encroachments in the road easement (i.e. fences, structures, etc.)?**  
\_\_\_\_\_ Yes \_\_\_\_\_ No If yes, identify: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. **Existing Improvements: Describe the type and specifications of improvements within the road easement. Attach additional pages describing improvements as necessary.**

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Other improvements located within the road easement (utilities, fire protection, mailbox facilities, water supply, wastewater treatment, pedestrian walks, school bus turnout, etc.):

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I, the above-mentioned Applicant, request review of the road adjustment application. The information presented with this application is true and accurate to the best of my knowledge.

Signed: \_\_\_\_\_ Date \_\_\_\_\_  
Applicant

- ATTACH ROAD ADJUSTMENT PETITION
- ATTACH MAP SHOWING ROAD ADJUSTMENT

**Application Check-Off Sheet  
Road Establishment, Alteration or Abandonment**

**INFORMATION REQUIRED FOR ROAD ADJUSTMENT APPLICATION**

I am submitting the following materials as part of this application:

\_\_\_ Pre-Application conference has been held on \_\_\_\_\_,  
Planner \_\_\_\_\_

\_\_\_ Initial non-refundable application fee of \$300

**Copy of the following:**

\_\_\_ Application

\_\_\_ Petition

\_\_\_ A site plan (drawn to scale)

- Must show the existing road easement, proposed road adjustment, property lines, encroachments, location of utilities and all other easements.

\_\_\_ Vicinity map or maps

\_\_\_ Road Information, certificate(s) of survey, deed(s), resolution(s), etc.

\_\_\_ List of the names and addresses of the adjacent property owners of record, all affected property owners and each purchaser under contract for deed of property adjoining the land

\_\_\_ Copy of existing and proposed covenants and restrictions

\_\_\_ Copy of articles of incorporation for Home Owners Association

\_\_\_ Any improvement district(s) the proposed subdivision is/would be part of

\_\_\_ Copy of all previously approved permits i.e.: weed management plans, approach permits, etc.

\_\_\_\_\_  
**Client's Signature**

\_\_\_\_\_  
**Planner's Signature**

**FOR OFFICE USE ONLY:**

**Received By:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Time:** \_\_\_\_\_



# Appendix B

## Bridge Standards





# **LEWIS AND CLARK COUNTY**

## **BRIDGE STANDARDS**



**Adopted: November 25, 2014**

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**Standard Specifications**

Construction of new bridges or reconstruction of existing bridges proposed for dedication to the County shall conform to these standards. Bridges and large culverts (for the purposes of this standard, large culverts will be defined as those having a diameter greater than 24-inches) design and construction will conform to the following specifications unless otherwise modified or amended in these Bridge Standards.

- *AASHTO LRFD Bridge Design Specifications*, current edition and any amendments thereto.
- *Montana Department of Transportation Bridge Design Manual*, current edition and any amendments thereto.

The County reserves the right to have the ultimate authority over decisions made regarding this standard. To that end, variances may be granted in circumstances that warrant deviations from the requirements included herein.

**Minimum Bridge Design Standards**

**TABLE B1. Minimum Bridge Design Standards**

Live loading	HL 93 loading with a 30 PSF allowance for future wearing surfaces.
Bridge Width	Refer to Table B2
Design Flood Event & Freeboard	Refer to Table B2
Riprap Slope	Maximum 1.5:1 (horizontal:vertical) slope. A 2:1 slope is desirable.
Drainage	Bridges shall be sufficiently cambered, crowned, or superelevated to provide adequate storm drainage.
Bridge Rail	Meet crash test criteria as specified in NCHRP 350 TL-2 or resist design forces specified in AASHTO LRFD TL-2 (Table A13.2-1).
Traffic Safety & Signing	Conform to <i>Manual of Uniform Traffic Control Devices for Streets and Highways</i> , current edition and any amendments thereto.
Bridge Approach Guardrail	Refer to Table B3
Road Approaches	Refer to <i>Lewis &amp; Clark County Road Standards</i> .

**TABLE B2. Minimum Bridge Width, Design Flood Event, & Freeboard**

<b>Road Classification (As defined in the Public Works Manual)</b>	<b>Minimum Useable Bridge Width<sup>1</sup></b>	<b>Minimum Design Flood Event<sup>2</sup></b>	<b>Design Freeboard<sup>3</sup></b>
Local Road (1-400 ADT)	24'	25-year	12-inches
Local Road (401-1500 ADT)	24'	100-year	12-inches
Minor Collector	28'	100-year	12-inches
Major Collector	32'	100-year	12-inches

<sup>1</sup>Bridge width at a minimum must accommodate the full width of the travel lanes of approach roads.

<sup>2</sup>A hydraulic analysis is to be performed on new structures (all bridges, all irrigation structures, and culverts as determined necessary by the County) draining an area greater than one acre. Consult the County during the hydraulic analysis for input on historic flood volumes.

<sup>3</sup>Additional freeboard may be required by the County for streams which carry a large amount of debris. The waterway opening size for a culvert must meet the requirements of the culvert section of these Bridge Standards.

**Bridge Approach Guardrail**

Existing bridge approach guardrail connecting to the bridge rail shall be removed and replaced with new approach guardrail if it does not meet the requirements of this Section. MDT approved approach guardrail is required on bridges with an ADT of over 400 vehicles per day. Roads with an ADT of 100 to 400 vehicles per day may utilize the standard flared end approach rail section detail outlined in this standard. Consistent with the AASHTO low-volume local road guidelines, approach guardrail should be considered on a case-by-case basis for bridges with ADT under 100 vehicles per day.

**TABLE B3. Bridge Approach Guardrail**

<b>Average Daily Traffic (ADT)</b>	<b>Bridge Approach Guardrail</b>
1- 100 vehicles per day	Consult County
101-400 vehicles per day	37.5' W-Beam flared approach guardrail. Contact County for detailed drawings.
Over 400 vehicles per day	MDT approved guardrail (impact attenuators and transition rails)

### **Quality Control**

All new bridges must be designed and stamped by a professional engineer registered with the State of Montana. Submit two copies of stamped 11"x17" bridge plans and specifications to the County for review and approval. Upon completion of the bridge, the design engineer shall inspect the bridge and certify, in writing, that the bridge was built in accordance with the approved plans and specifications. The design engineer will provide the Public Works Department with one set of 11"x17" As-Constructed plans of the project for their records. For all bridges with spans 20-feet and longer, one set of 11"x17" As-Constructed plans shall also be sent to the MDT Bridge Bureau.

### **Geotechnical**

Where a comprehensive geotechnical investigation is deemed a requirement by the County, a reputable geotechnical engineering firm is to be retained to determine the engineering properties of the soils through the use of borings, test pits, sampling and other methods. The geotechnical report must be stamped by a professional engineer registered with the State of Montana. Submit the Geotechnical Report to the County for review and approval.

### **Historical Bridges**

A structure determined to have significant historic or cultural resource value(s) and/or is listed or eligible to be listed with the *National Register of Historic Places* requires the Historic Preservation Commission and the State Historic Preservation Office (SHPO) be contacted prior to beginning demolition/rehabilitation activities. These agencies will then make a recommendation to the County regarding the proposed alteration/demolition of the structure.

### **Permitting**

Any proposed project that occurs in or near an intermittent or perennial natural water body is subject to review and approval by various local, state and federal agencies. The *Guide to Stream Permitting in Montana* is to be followed to determine which permits are required for various type of work. A 124 Permit (FWP), 318 Permit (DEQ), 404 Permit (Corps) and Floodplain Development Permit will generally be required for all projects. Private projects will require a 310 Permit (Local Conservation District) in place of the 124 Permit. For projects in areas designated as being within the 100 & 500 year floodplains contact the County Floodplain Administrator for permit requirements.

The proposed bridge work may require a *General Permit for Storm Water Discharges Associated with Construction Activities*. Temporary erosion and sediment control measures includes the installation and maintenance of temporary structural control measures to reduce or eliminate

the erosion of soil and transport of sediment offsite as result of construction activities. Contact the Montana Department of Environmental Quality for construction storm water permit requirements.

### **Culvert Design Procedures**

Culverts will generally be designed to extend beyond the clear zone in order to improve safety and eliminate the need for guardrail. Culvert headwater (HW) will be kept to a reasonable level at the design flow to prevent flooding of adjacent property. Headwater depths at design flow will generally follow the MDT design criteria listed below where D is the diameter of a circular pipe and R is the rise of an arch pipe.

<u>Pipe Size</u>	<u>HW @ Design Flow</u>	<u>HW @ 100 Year Flow</u>
≤ 42"	< 3D or 3R	< 4D or 4R
48"-108"	<1.5D or 1.5R	< D+5' or R+5'
≥ 120"	< D+2' or R+2'	< D+4' or R+4'

- a) Culvert opening shall prevent roadway overtopping at the design flow.
- b) Culvert alignment will match the horizontal and vertical configuration of the existing channel as closely as possible to minimize sedimentation. Culverts are to be adequately sized to accommodate debris or ice that may occur in the channel.
- c) Open bottom culverts, such as aluminum, steel, or concrete boxes, are to be considered where feasible. Open bottom culverts will be set on either a metal or concrete footing per the manufacturer's recommendation.
- d) Culverts over 48-inches in diameter will have cutoff walls on both the upstream and downstream ends to prevent erosion below the pipe.
- e) The upstream fill slope is to be adequately protected against erosion. Slopes of 3:1 or flatter may only require reseeding whereas a more severe slope (>3:1) will either have rock riprap or a concrete headwall. Culverts with upstream fill slopes exceeding 2:1 are to have concrete headwalls.
- f) There may be federal or state permitting implications that affect culvert design. Designer shall consult with permitting agencies for additional design considerations such as fish passage.

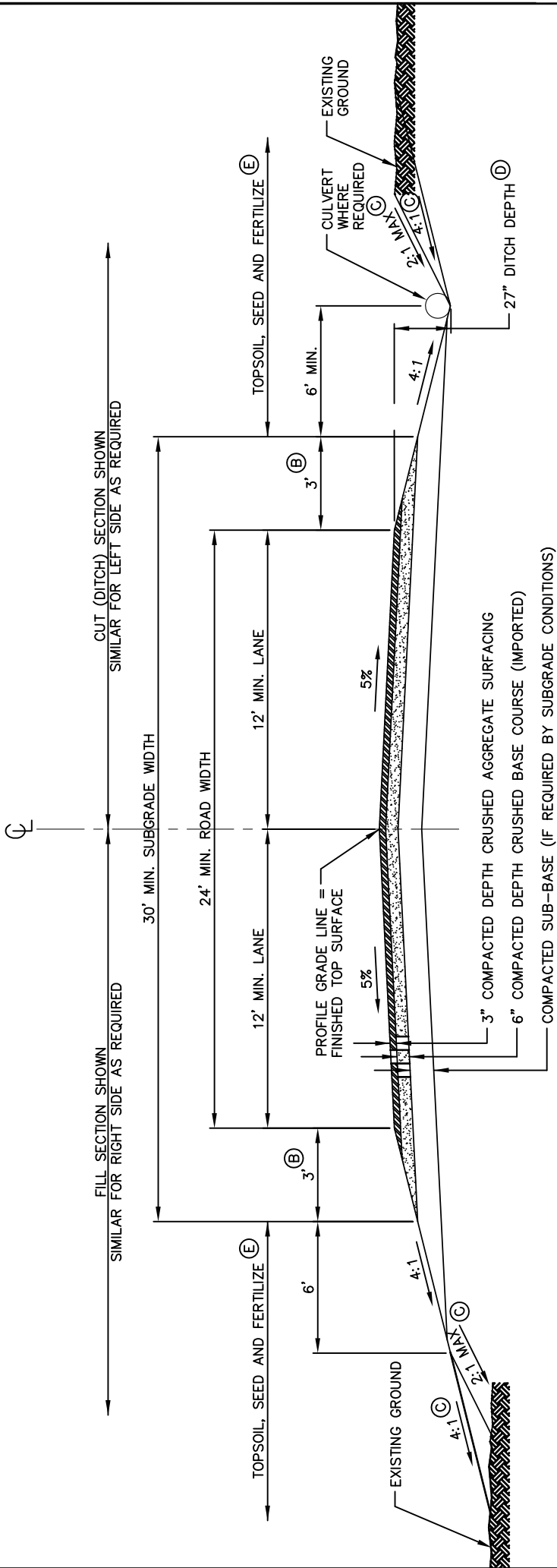
### **Culvert End Treatments**

Culverts will have appropriate end treatments in order to conform to site conditions, maximize hydraulic efficiency, and enhance public safety.

Appendix C  
Design Standards  
Drawings







**FOOTNOTES:**

DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

(A) REFER TO TYPICAL ROAD SECTION #2 IF PAVED SURFACE IS REQUIRED. TYPICAL ROAD SECTION #1 APPLICABLE TO GRAVEL SURFACED ROADS ONLY.

(B) BASED ON THE MIN. 3" DEPTH CRUSHED AGGREGATE SURFACING AND 6" DEPTH OF CRUSHED BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE. PLACE ADDITIONAL 3" COMPACTED DEPTH CRUSHED AGGREGATE SURFACING ON 3' SURFACING INSLOPE (TYPICAL EACH SIDE).

(C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.

(D) 27" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.

(E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.

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REVISION NO.	APPROVED BY



TITLE

**DEPARTMENT OF PUBLIC WORKS**

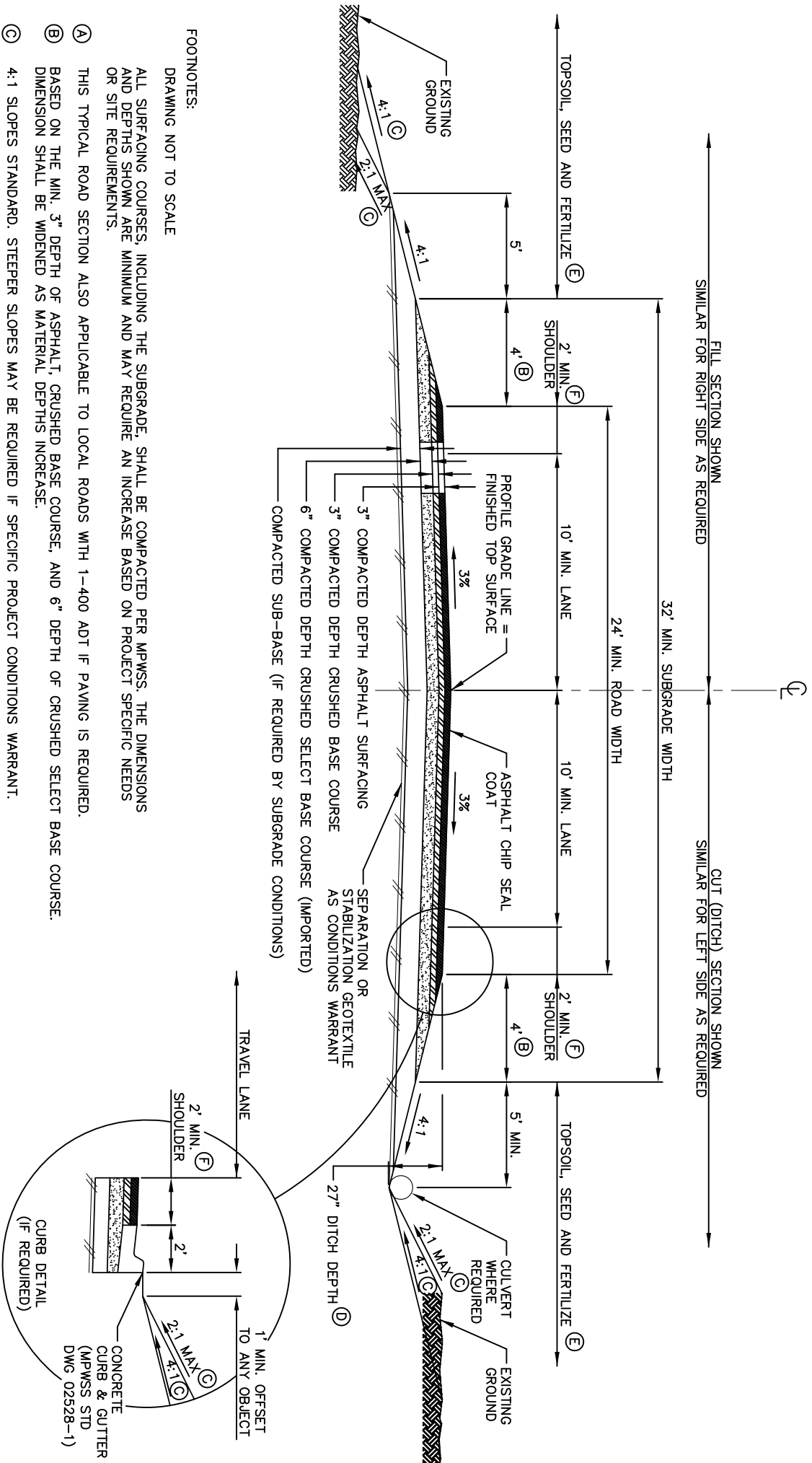
FIGURE 1 - TYPICAL SECTION #1 (A)

TYPICAL GRAVEL ROAD SECTION - LOCAL ROAD: 1-400 ADT

SHEET

1

1 OF 4



- FOOTNOTES:  
DRAWING NOT TO SCALE
- ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.
- (A) THIS TYPICAL ROAD SECTION ALSO APPLICABLE TO LOCAL ROADS WITH 1-400 ADT IF PAVING IS REQUIRED.
  - (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
  - (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
  - (D) 27" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
  - (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
  - (F) WIDEN SHOULDER IF PARKING IS REQUIRED.

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REVISION NO.		APPROVED BY	

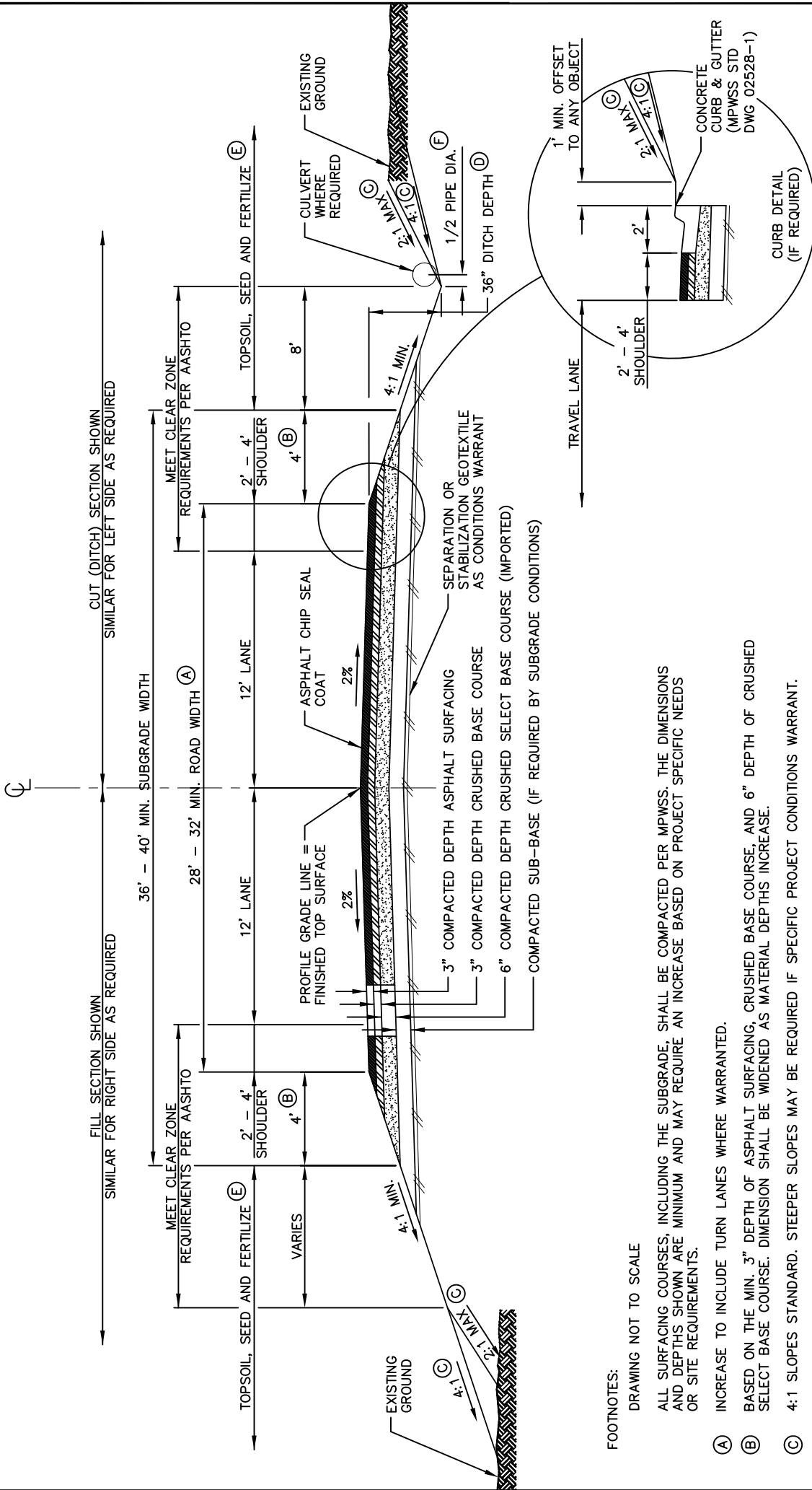


TITLE

DEPARTMENT OF PUBLIC WORKS

FIGURE 2 - TYPICAL SECTION #2  
TYPICAL PAVED ROAD SECTION - LOCAL ROAD: 401-1500 ADT (A)

SHEET

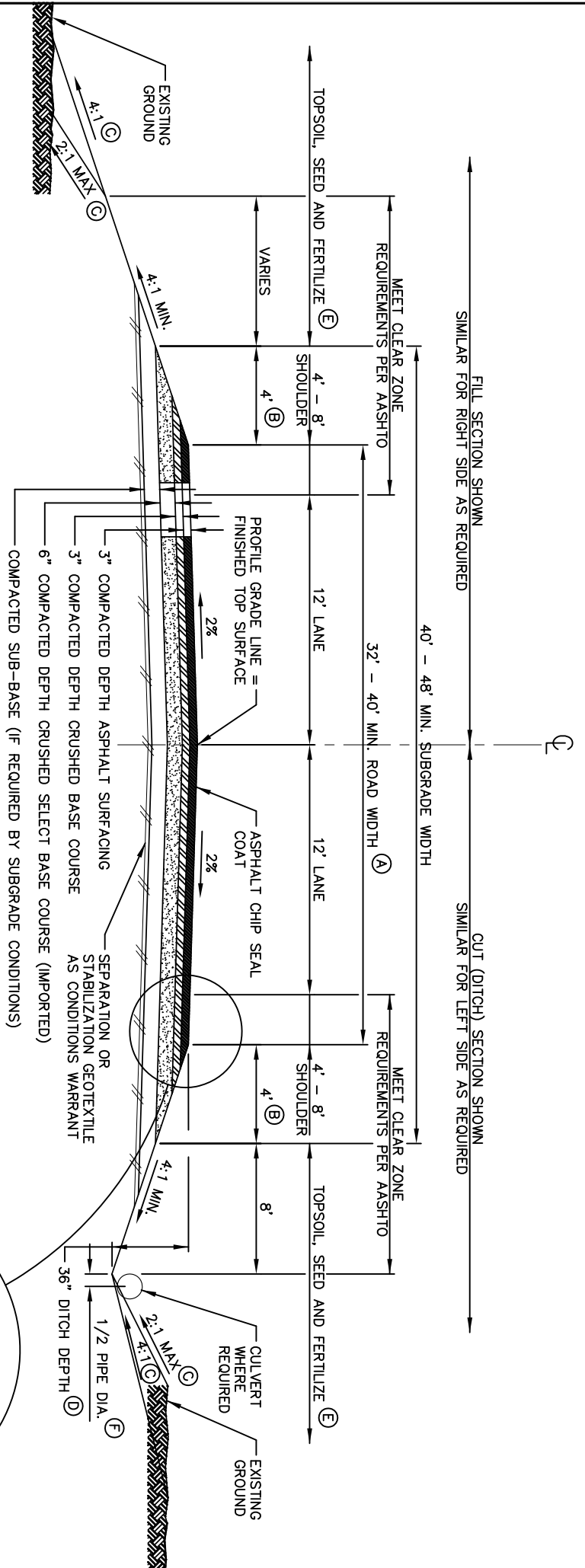


**FOOTNOTES:**

DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

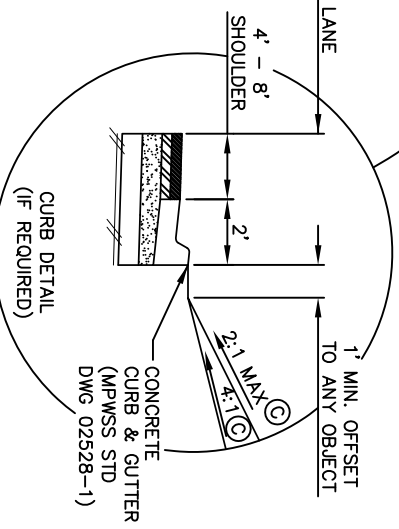
- (A) INCREASE TO INCLUDE TURN LANES WHERE WARRANTED.
- (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT SURFACING, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
- (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
- (D) 36" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
- (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
- (F) CULVERT PIPE PLACED SLIGHTLY ABOVE DITCH GRADE CLOSER TO ROW EDGE WITH MANUFACTURER'S RECOMMENDED COVER & GRADE (12" MINIMUM COVER).



FOOTNOTES:  
DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

- (A) INCREASE TO INCLUDE TURN LANES WHERE WARRANTED.
- (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT SURFACING, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
- (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
- (D) 36" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (18" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
- (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
- (F) CULVERT PIPE PLACED SLIGHTLY ABOVE DITCH GRADE CLOSER TO ROW EDGE WITH MANUFACTURER'S RECOMMENDED COVER & GRADE (12" MINIMUM COVER).

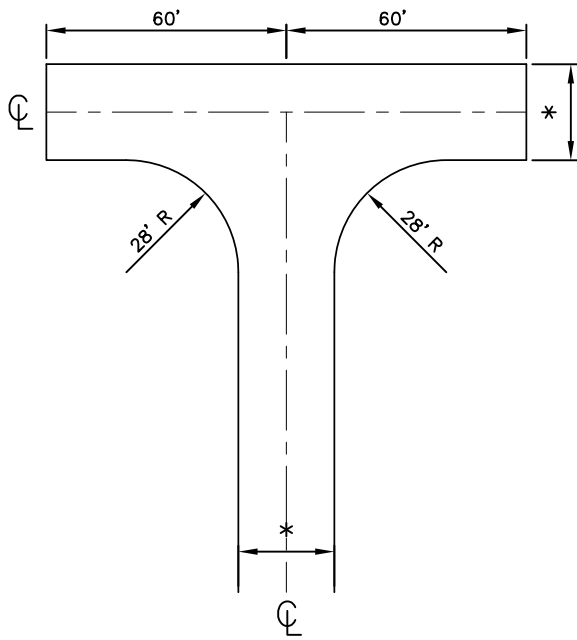


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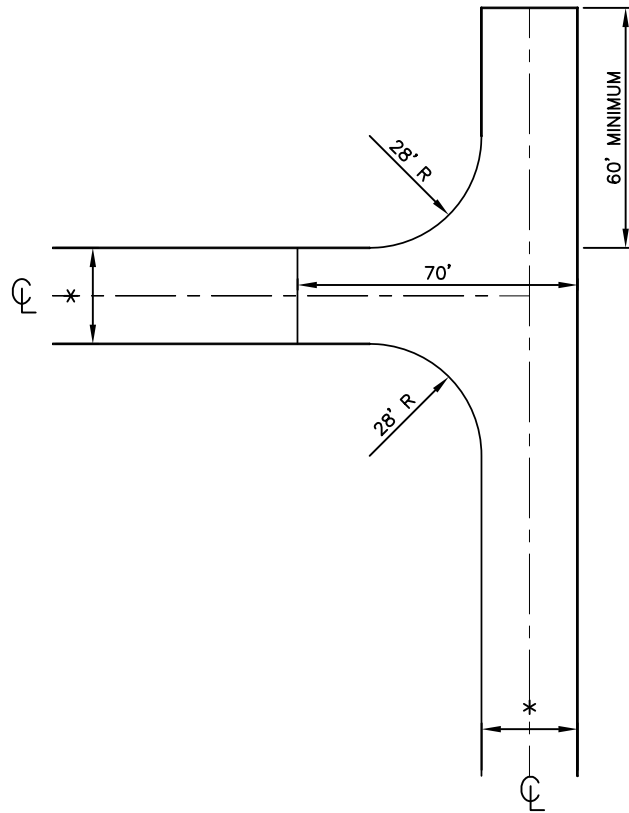


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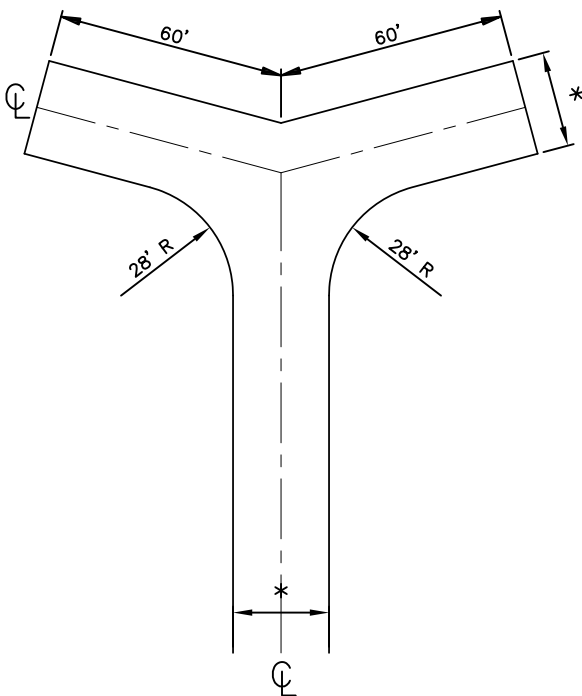
DEPARTMENT OF PUBLIC WORKS  
FIGURE 4 - TYPICAL SECTION #4  
TYPICAL PAVED ROAD SECTION - MAJOR COLLECTOR



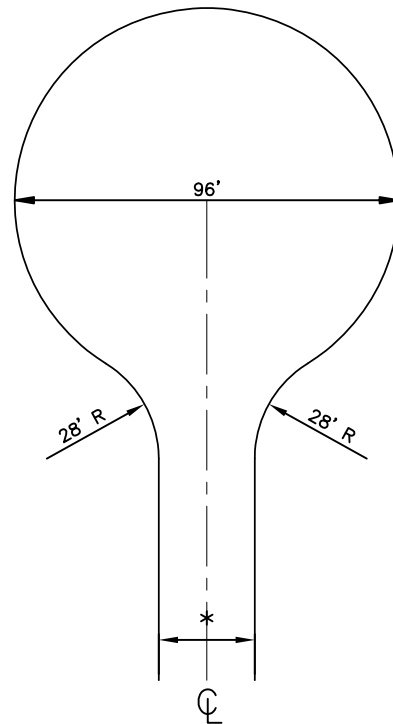
120' HAMMERHEAD



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



96' CUL-DE-SAC

TURNAROUNDS ARE BASED ON THE INTERNATIONAL FIRE CODE INSTITUTE APPLICATION MANUAL (1995 E)

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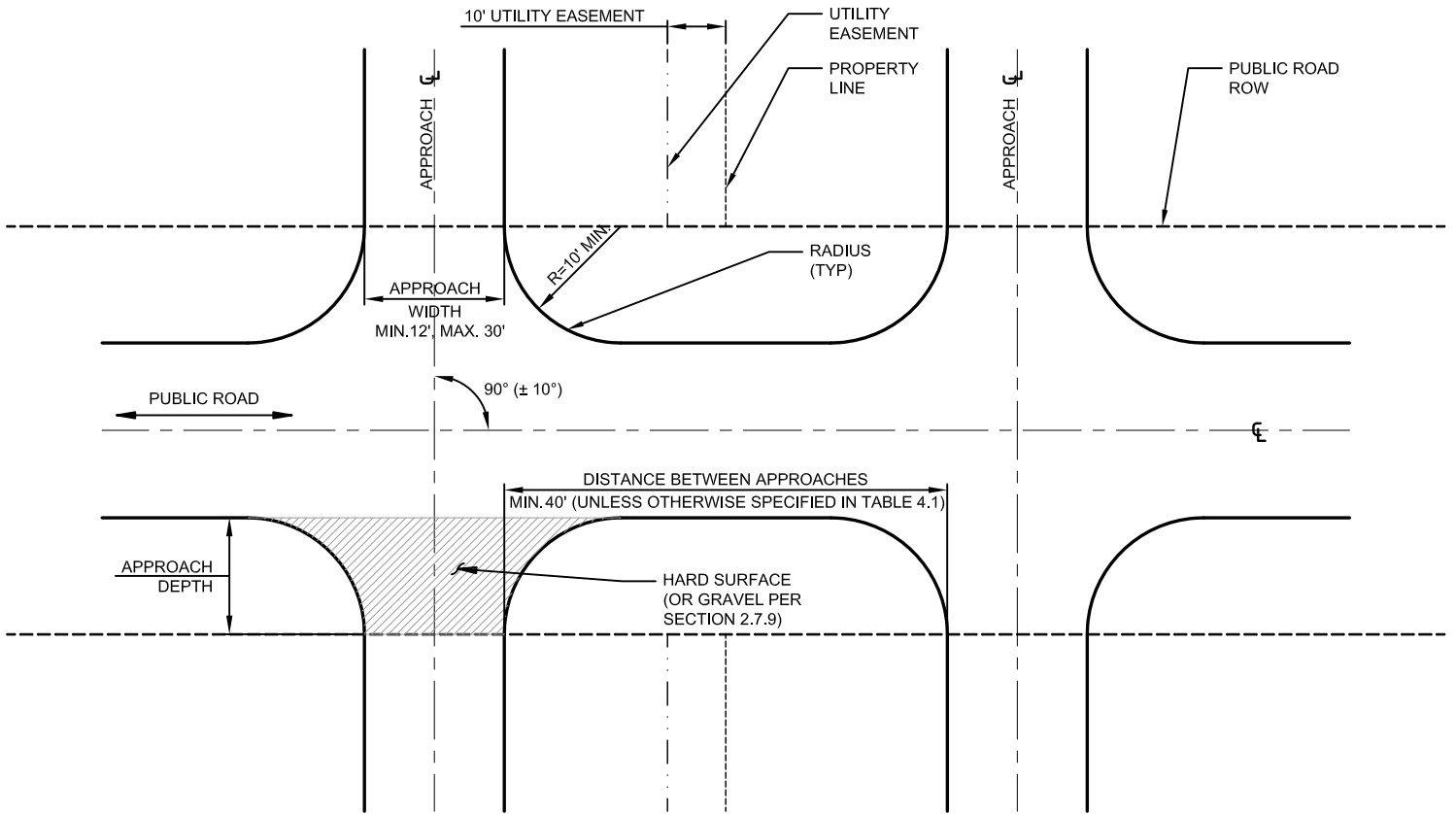
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DEPARTMENT OF PUBLIC WORKS  
ACCEPTABLE TURNAROUNDS  
FIGURE 5

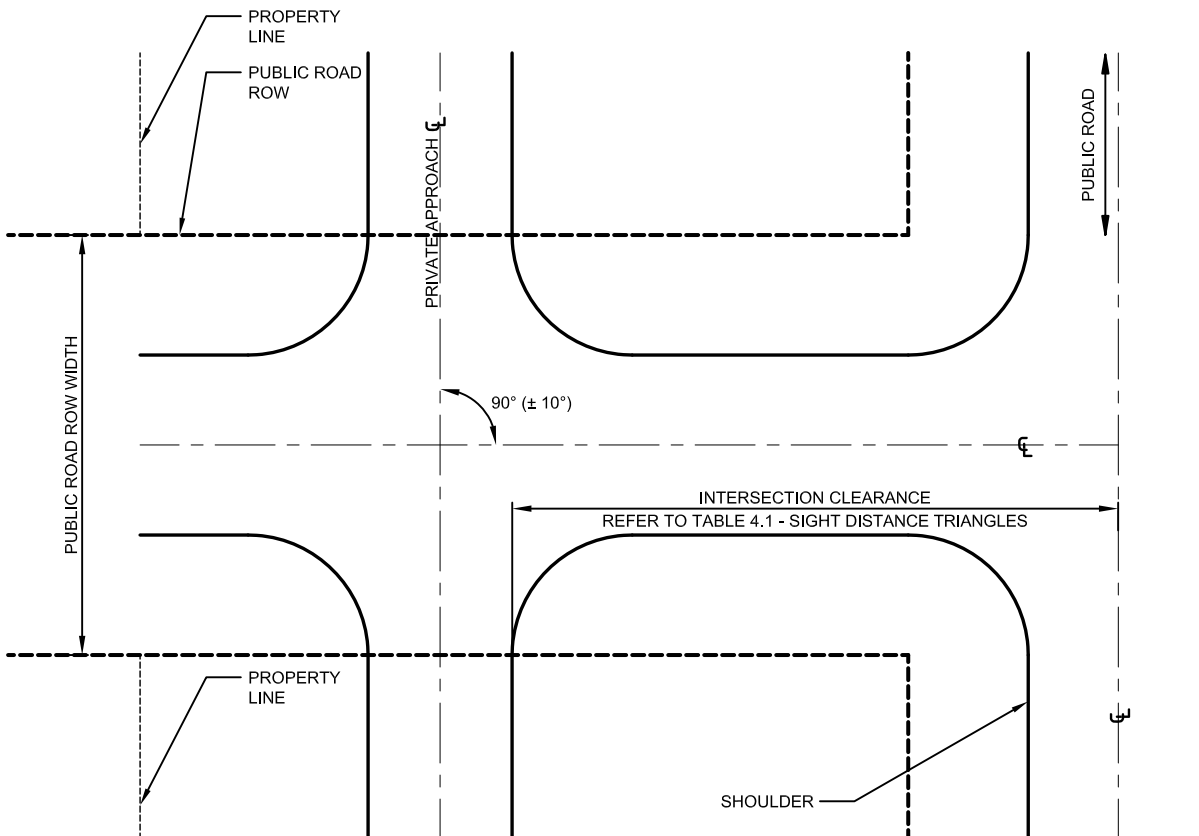
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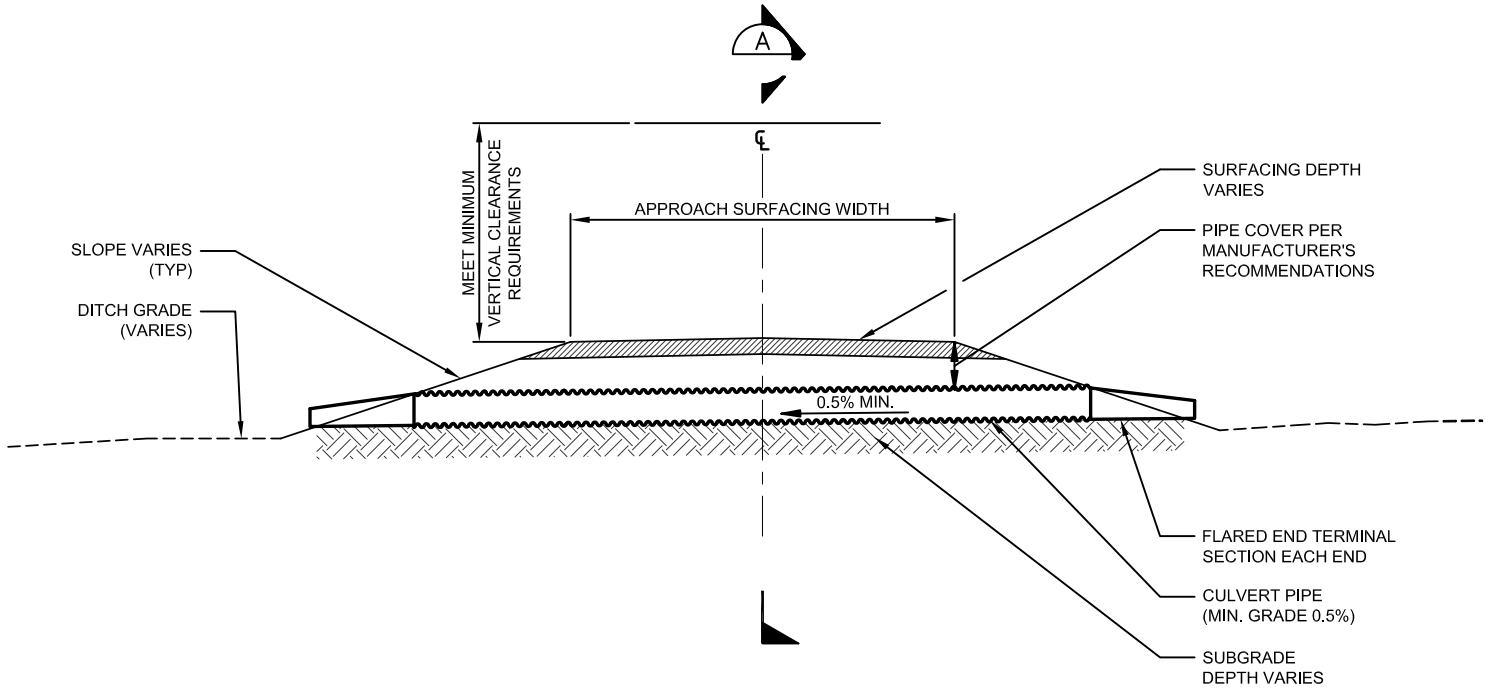


**SEPARATION BETWEEN DRIVEWAY APPROACHES**

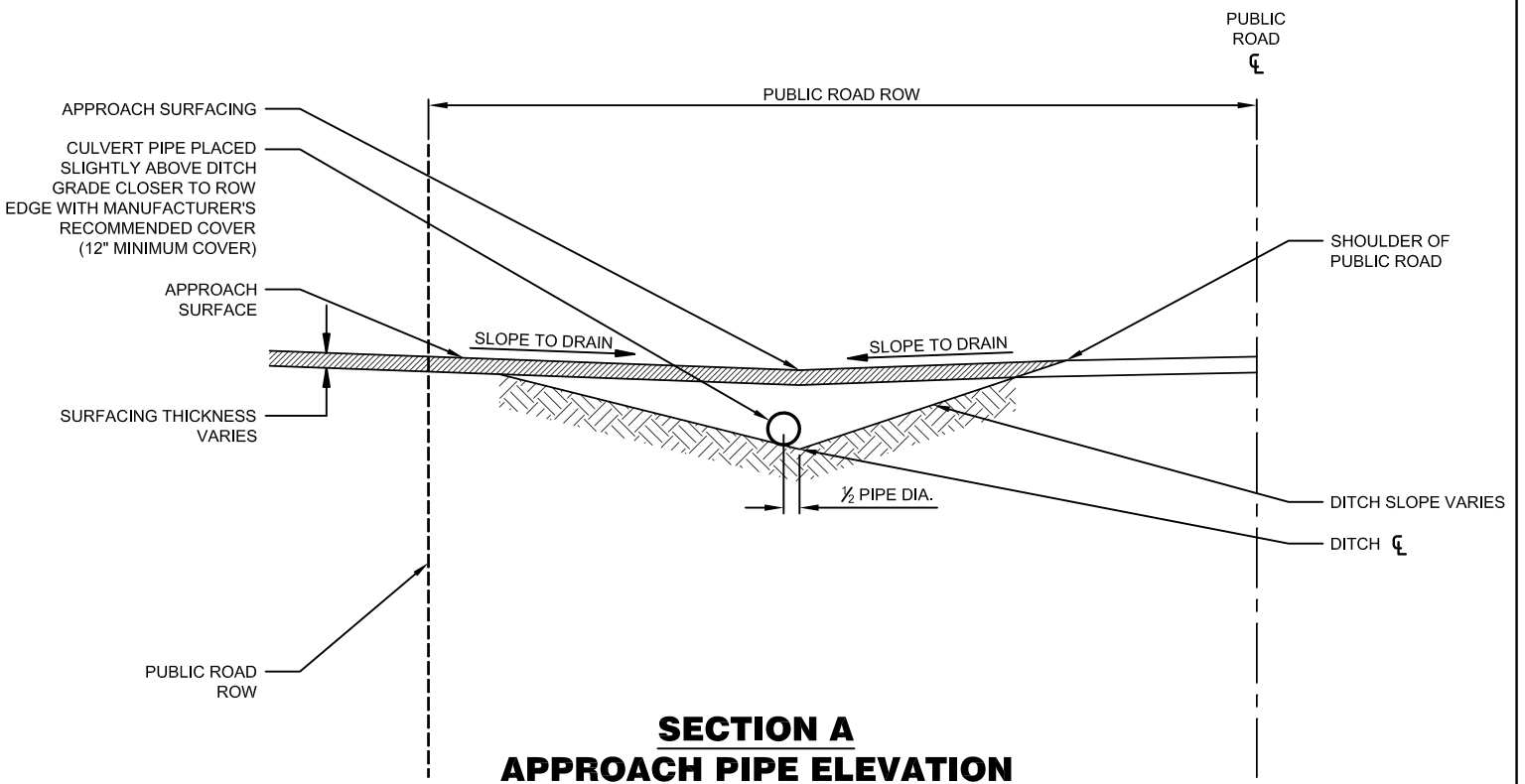


**APPROACH SEPARATION TO INTERSECTION OF PUBLIC ROAD**

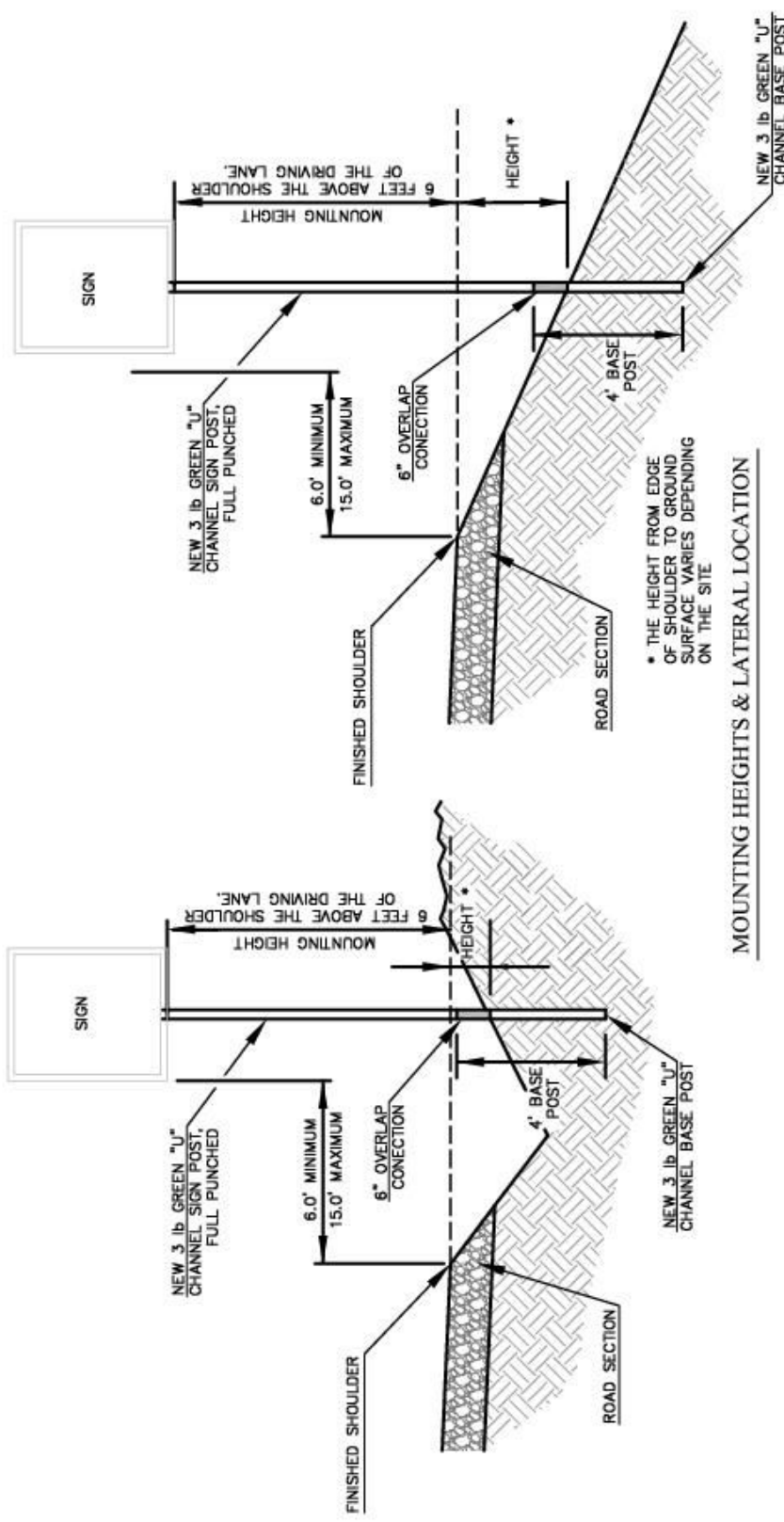
FIGURE 6A - APPROACH DRAINAGE STANDARDS



**APPROACH PIPE PROFILE**



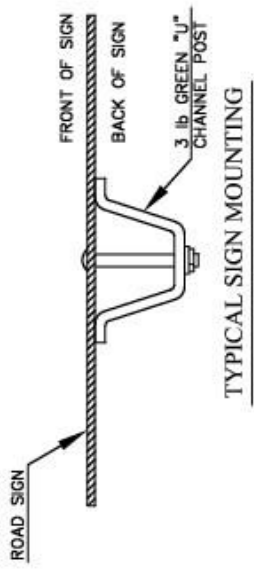
**SECTION A  
APPROACH PIPE ELEVATION**



**MOUNTING HEIGHTS & LATERAL LOCATION**

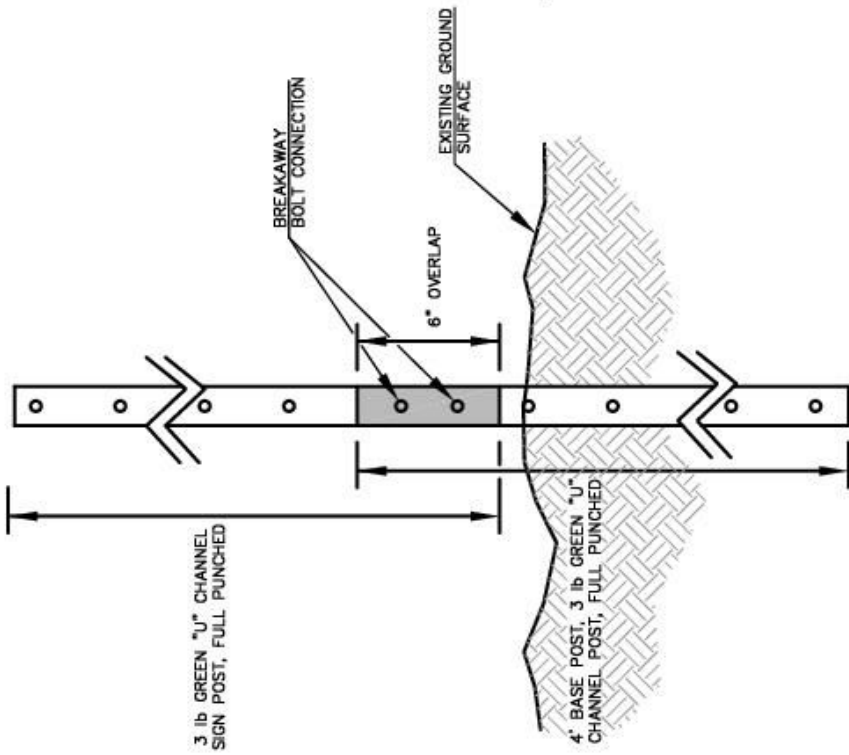
**NOTES:**

1. ESTABLISH THE CORRECT LOCATION FOR THE POST AND CALL FOR UTILITY LOCATES.
2. DRIVE A 4' 3 lb FULL PUNCHED GREEN "U" CHANNEL POST (BASE POST) INTO THE GROUND LEAVING 4 TO 6 INCHES ABOVE GRADE. ESTABLISH THE CORRECT HEIGHT OF POST, CUT THE SIGN POST AND ATTACH IT TO THE BASE POST BY OVERLAPPING THE SIGN POST AND BASE POST BY 6" AND CONNECT USING TWO BREAKAWAY BOLTS. (SEE FIGURE 2)
3. STOP, YIELD, AND STREET SIGNS WILL BE INSTALLED ON THE RIGHT HAND SIDE OF THE ROAD AS THE DRIVER APPROACHES THE INTERSECTION.
4. ONLY ONE STREET SIGN(S) PER INTERSECTION.
5. ALL SIGN MOUNTING HARDWARE MAY BE PURCHASED FROM LEWIS & CLARK COUNTY.

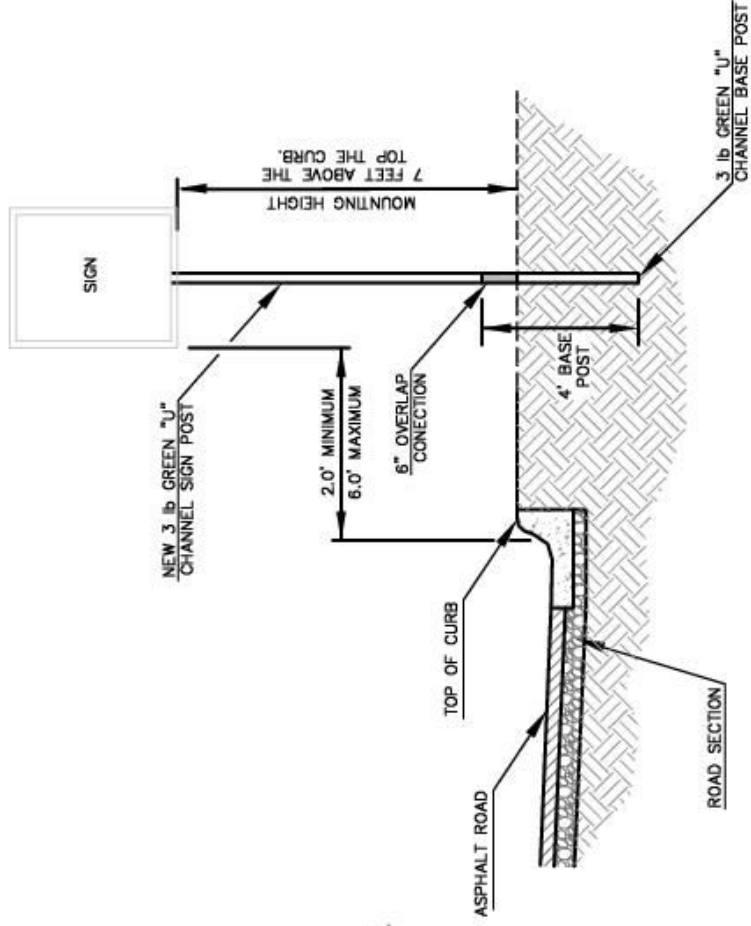


**FIGURE 7 - SIGN MOUNTING GUIDELINES**





BASE POST & SIGN POST CONNECTION



MOUNTING HEIGHTS & LATERAL LOCATION

FIGURE 8- SIGN MOUNTING GUIDELINES



# Appendix D

## Flood Plain

## Regulations



**LEWIS AND CLARK COUNTY FLOOD PLAIN  
ORDINANCE  
SEPTEMBER 19, 2012**

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# **SECTION 1. GENERAL PROVISIONS**

## **1.1 FLOOD PLAIN HAZARD MANAGEMENT REGULATIONS**

This ordinance contains “Flood Plain Hazard Management Regulations;” hereinafter referred to as “these regulations.”

## **1.2 STATUTORY AUTHORITY**

1. Flood Plain and Floodway Management is incorporated in Montana Code Annotated Title 76, Chapter 5 and describes the authority, procedures and minimum standards for local regulations.
2. The authority to regulate development in specifically identified flood hazard areas is granted to communities by state statute 76-5-301 MCA, to promote the general public health, safety, and welfare.

## **1.3 FINDINGS OF FACT**

1. Flood hazard areas specifically adopted herein as Regulated Flood Hazard Areas have been delineated and designated by the Department of Natural Resources and Conservation and/or the Federal Emergency Management Agency pursuant to 76-5-201, MCA.
2. The proposed regulations have been reviewed and approved by the Montana Department of Natural Resources and Conservation and the Federal Emergency Management Agency to meet the prescribed minimum standard for development and procedures.

## **1.4 PURPOSE**

These regulations promote public health, safety and general welfare of the residents and minimize public and private losses due to flood conditions in Regulated Flood Hazard Areas. These Regulations:

1. Protect human life and health;
2. Minimize expenditure of public money for costly flood control projects;
3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. Minimize prolonged business and public service interruptions;
5. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges;



6. Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood disruptions; and to
7. Ensure compliance with the minimum standards for the continued participation in the National Flood Insurance Program for the benefit of the residents.

### **1.5 METHODS TO REDUCE LOSSES**

These regulations are intended to reduce flood losses through the following methods.

1. Restrict or prohibit uses that are dangerous to health, safety or property in times of flooding or that may cause excessive increases in flood heights or velocities;
2. Require that uses of land vulnerable to floods, including public facilities, be developed or constructed to at least minimum standards or to otherwise minimize flood damage;
3. Regulate the alteration of natural floodplains, stream channels, and natural protective barriers which are needed to accommodate floodwaters;
4. Regulate filling, grading, dredging and other development which may increase flood damage;
5. Prevent or regulate the construction of flood barriers which will impact other land, flood water depth or velocity of floodwaters;
6. Distinguish between the land use regulations applied to the floodway within the Regulated Flood Hazard Area and those applied to that portion of the Regulated Flood Hazard Area not contained in the floodway;
7. Apply more restricted land use regulations within the floodway of the Regulated Flood Hazard Area; and
8. Ensure that regulations and minimum standards balance the greatest public good with the least private injury.

### **1.6 JURISDICTIONAL AREA**

These regulations apply only to the flood hazard areas specifically adopted herein as Regulated Flood Hazard Areas and are more fully described in Section 4. The requirements and approvals for alterations to the specific jurisdictional area are in Section 4 as well. Areas within the Regulated Flood Hazard Area have specific areas identified as a Flood Plain, Floodway, or Flood Fringe that have differing uses allowed and minimum building standards that apply.

### **1.7 FLOOD PLAIN ADMINISTRATOR**

A Flood Plain Administrator is hereby officially appointed and is the responsibility of the office of Disaster and Emergency Services to administer and implement the provisions of these regulations.

### **1.8 ABROGATION AND GREATER RESPONSIBILITY**

It is not intended by these regulations to repeal, abrogate, or impair any existing easements, covenants, deed restrictions, or underlying zoning. However, where these regulations impose greater restrictions, the provision of these regulations must prevail.

## **1.9 REGULATION INTERPRETATION**

In the interpretation and application of these regulations, all provisions must be; (1) considered as minimum requirements; (2) liberally construed in favor of the governing body; and (3) deemed neither to limit nor repeal any other powers granted under state statutes.

## **1.10 WARNING AND DISCLAIMER OF LIABILITY**

These regulations do not imply that land outside the Regulated Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. These regulations shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on these regulations or any administrative decision lawfully made hereunder.

## **1.11 SEVERABILITY**

If any section, clause, sentence, or phrase of these regulations is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding will in no way affect the validity of the remaining portions of these regulations.

## **1.12 DISCLOSURE PROVISION**

All property owners or their agents in the Regulated Flood Hazard Areas shall notify potential buyers or their agents that such property is located within the Regulated Flood Hazard Areas and is subject to regulation and any permitted uses that are transferred. Information regarding Regulated Flood Hazard Areas and the repository for Flood Plain maps is available in the Flood Plain Administrator's office.

## **1.13 ARTIFICIAL OBSTRUCTIONS AND NONCONFORMING USES**

1. Artificial obstructions and nonconforming uses in a Regulated Flood Hazard Area not exempt under Section 5 is a public nuisance unless a permit has been obtained. These regulations do not affect any existing artificial obstruction or nonconforming use in the Regulated Flood Hazard Area before the land use regulations have been adopted.

An alteration, any change or addition to an artificial obstruction or nonconforming use not exempt under Section 5 that increases the size or increases its potential flood hazard, requires a permit. Maintenance of an artificial obstruction or nonconforming use is not an alteration

## **1.14 AMENDMENT OF REGULATIONS**

Once adopted, these regulations may be amended after a public notice, hearing and the approval of DNRC and FEMA.

## **1.15 PUBLIC RECORDS**

Records including permits and applications, elevation and flood proofing certificates, certificates of compliance, fee receipts, and other matters relating to these regulations must be maintained by the Flood Plain Administrator and are public records and must

be made available for inspection and for copies upon reasonable request. A reasonable copying cost for copying documents for members of the public may be charged and may require payments of the costs before providing the copies.

### **1.16 LAND DIVISIONS AND SUBDIVISION REVIEW**

Any land divisions and subdivision approval including new or the expansion of existing manufactured home parks within the Regulated Flood Hazard Area must be designed to meet the following criteria:

1. The base flood elevations and boundary of the Regulated Flood Hazard area are determined and considered during lot layout and building location design;
2. Locations for future structures and development are reasonably safe from flooding; Adequate surface water drainage is provided to reduce exposure to flood hazards;
3. Public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize or eliminate flood damage; and
4. For development within the Regulated Flood Hazard Area, permits according to these regulations must be obtained before development occurs.

### **1.17 DISASTER RECOVERY**

Upon completion of structure condition survey within the Regulated Flood Hazard Area, the Flood Plain Administrator shall notify owners that a permit may be necessary before repair or reconstruction commences on structures that:

1. Have sustained 30% or more in flood damages;
2. Have been swept away;
3. Have one or more collapsed or missing walls;
4. Cannot be reoccupied without major structural work; or
5. Have sustained more than two feet of water over the first floor.

Structures that have suffered substantial damage or will undergo substantial improvements require a flood plain application and permit and must be upgraded to meet the minimum building standards herein during repair or reconstruction.

Flood Plain Administrators coordinate assistance and provide information to structure owners concerning Hazard Mitigation and Recovery measures with Federal Emergency Management Agency, Montana Department of Natural Resources and Conservation, and other state, local and private emergency service organizations.

## SECTION II. DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted as to give them the meaning they have in common usage and the most reasonable application. For the purpose of this ordinance, the following definitions are adopted:

**Alteration** – Any change or addition to an artificial obstruction that either increases its external dimensions or increases its potential flood hazard. See also, Substantial Improvement.

**Artificial Obstruction**– Any obstruction which is not natural and includes any dam, diversion, wall, riprap, embankment, levee, dike, pile, abutment, projection, revetment, excavation, channel rectification, road, bridge, conduit, culvert, building, refuse, automobile body, fill or other analogous structure or matter in, along, across, or projecting into any Regulated Flood Hazard Area that may impede, retard, or change the direction of the flow of water, either in itself or by catching or collecting debris carried by the water, or that is placed where the natural flow of the water would carry the same downstream to the damage or detriment of either life or property. See also Development.

**Base Flood (Flood of 100 Year Frequency)** – A flood having a one percent (1%) chance of being equaled or exceeded in any given year

**Base Flood Elevation (BFE)** – The elevation above sea level of the base flood in relation to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 or unless otherwise specified.

**Channel** – The geographical area within either the natural or artificial banks of a watercourse or drain way.

**DNRC** – Montana Department of Natural Resources and Conservation.

**Development** – means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

**Encroachment** – activities or construction within the **Flood Plain** including fill, new construction, substantial improvements, and other development.

**Establish** – To construct, place, insert, or excavate.

**Flood Plain Boundary** – The Regulated Flood Hazard boundary is based on base flood elevations.

**Lowest Floor** – Means any floor used for living purposes, storage, or recreation. This includes any floor that could be converted to such a use.

**Manufactured Home Park or Subdivision** – includes the construction of facilities for servicing the manufactured home lots and at a minimum includes the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads.

**FEMA** – Federal Emergency Management Agency

**Regulated Flood Hazard Area** – A Flood Plain whose limits have been designated pursuant to Part 2, Chapter 5 of Title 76, MCA, and is determined to be the area adjoining the watercourse that would be covered by the floodwater of a base flood, a flood of a 100-year frequency, except for sheet flood areas that receive less than 1 foot of water per occurrence. The Regulated Flood Hazard Area consists of the **Floodway** and **Flood Fringe** where specifically designated.

**Flood Plain** – means the area adjoining the watercourse or drainway that would be covered by the floodwater of a flood of a 100-year frequency.

**Flood of 100 Year Frequency (Base Flood)** – means a flood magnitude expected to recur on the average of once every 100-years or a flood magnitude that has a 1% chance of occurring in any given year.

**Flood Fringe** – the identified portion of the Regulated Flood Hazard Area outside the limits of the **floodway**.

**Floodway** – the identified portion of the Regulated Flood Hazard Area and is the channel and the areas adjoining the channel that are reasonably required to carry the discharge of the base flood without cumulatively increasing the water surface by more than one half foot.

**Flood Plain Administrator** – community official or representative appointed to administer and implement the provisions of this ordinance.

**Flood Proofing** – any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, HVAC systems, structures and their contents.

**Lowest Floor** – any floor used for living purposes, storage, or recreation. This includes any floor that could be converted to such a use.

**Manufactured or Mobile Home** – a structure that is transportable in one or more sections, built on a permanent chassis, and designed to be used with or without a permanent foundation when connected to the required utilities and includes park

trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days.

**New Construction** – Structures for which the **start of construction** commenced on or after the effective date of these ordinances and includes any subsequent improvements to such structures.

**New Manufactured Home Park Or Subdivision** – means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads and is completed on or after the effective date of floodplain management regulations adopted by a community.

**Owner** – any person who has dominion over, control of, or title to an obstruction.

**Recreational Vehicle** – A park trailer, travel trailer, or other similar vehicle which is (a) built on a single chassis; (b) 400 square feet or less when measured at the largest horizontal projections; (c) designed to be self-propelled or permanently towable by a truck; and (d) designed primarily for use as temporary living quarters for recreation, camping, travel, or seasonal use, not for use as a permanent dwelling.

**Regulated Flood Hazard Area** – The jurisdictional area of these ordinances and includes the Flood Plain, Flood Fringe and Floodway.

**Riprap** – Stone, rocks, concrete blocks, or analogous material that is placed within the Flood Plain for the purpose of preventing or alleviating erosion.

**Residential** – A building for living purposes or place of assembly or permanent use by human beings. All other buildings are **non-residential**.

**Scour Depth** – The maximum depth of streambed scour caused by erosive forces of the base flood discharge.

**Sheet Flooding** – Areas subject to 100-year flooding with depths of less than one (1) foot and removed from the main stream channel.

**Special Flood Hazard Area** – A term use by FEMA to refer to those areas identified as subject to flood hazard caused by the 100-year flood and utilized by FEMA for determining flood risk for National Flood Insurance premiums. The area becomes the Regulatory Flood Hazard area only when formally adopted by DNRC and community ordinance.

**Start of Construction** – Commencement of clearing, grading, filling, or excavating to prepare a site for construction.

**Structure** – a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home. A structure is also, bridge, culvert, dam, diversion, wall, revetment, dike, or other projection that may impede, retard, or alter the pattern of flow of water.

**Substantial Damage** – damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damage condition would exceed 50 percent of the market value of the structure before the damage occurred.

**Substantial Improvement** – any repair, reconstruction or improvement of a structure where the cost equals or exceeds fifty percent (50) of the market value of the structure either:

1. Before the improvement or repair is started , or
2. If the structure has been damaged, and is being restored, before the damage occurred. For the purposes of this definition, substantial improvement considered to occur when the first construction of any wall ceiling, floor or other structural part of the building commences. The term does not include:
  1. Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or
  2. Any alteration of a structure listed on the national register of historic places or state inventory of historic places.

**Suitable Fill** – fill material which is stable, compacted, well graded, and pervious, not adversely affected by water and frost, devoid of trash or similar foreign matter, tree stumps or other organic material; and is fitting for the purpose of supporting the intended use and/or permanent structure.

**Violation** – means a failure of a structure or other development to be fully compliant with these regulations.

## SECTION 3. FORMS AND FEES

**3.1 Forms** The following forms may be required by the Flood Plain Administrator:

1. **Flood Plain Permit Application** – is the “Joint Application for Proposed Work in Montana’s Steams, Wetlands, Regulated Flood Hazard Areas, and Other Water Bodies”, or other designated form.
2. **Flood Plain Permit Compliance Report** – required to be submitted by the Applicant to the Flood Plain Administrator once the permitted project in the Regulated Flood Hazard Area is completed or within the designated time stipulated on the Flood Plain permit. A compliance report including an elevation and or flood proofing certificate may be required were specified.
3. **Flood Plain Variance Application** – required to be submitted by the Applicant to the Flood Plain Administrator for review of the proposed project prior to the initiation of the project requiring a variance.
4. **Flood Plain Appeal** – required to be submitted by the Applicant to the Flood Plain Administrator for review of the proposed project prior to the initiation of the project.
5. **Flood Plain Emergency Notification** – required to be used by persons to notify the Flood Plain Administrator of projects undertaken during an emergency to safeguard life or structures. This is not a permit application and the person must take additional steps, as outlined in Section 9.
6. **Official Complaint Form** – may be used by any person to notify the Flood Plain Administrator of an activity taking place without an official signed Flood Plain permit. Persons may make complaints without use of this form.

### **3.2 Fees**

A permit fee will be \$60.



## **SECTION 4. JURISDICTIONAL AREA**

### **4.1 REGULATED FLOOD HAZARD AREAS**

1. The jurisdictional areas referenced herein as the Regulated Flood Hazard Area are:
  - A. Lewis and Clark County Flood Insurance Study , 9/19/12
  - B. Lewis and Clark County Digital Flood Insurance Rate Maps, 9/19/12.
  - C. The Regulated Flood Hazard Area specifically described or illustrated in the specific study including maps that has been delineated, designated and established by order of the DNRC or FEMA pursuant to 76-5-201, MCA.
  - D. Use allowances, design and construction requirements in these regulations vary by the specific areas identified as Floodway and Flood Fringe.

### **4.2 INTERPRETATION OF REGULATED FLOOD HAZARD AREA BOUNDARIES**

1. The mapped boundaries illustrated in the referenced studies in this Section are a guide for determining whether property is within the Regulated Flood Hazard Area.
2. A determination of the outer limits and boundaries of the Regulated Flood Hazard Area or the Flood Fringe and Floodway within the Regulated Flood Hazard Area includes an evaluation of the maps as well as the particular study data of the referenced study in this Section.
3. Boundary points of the Regulated Flood Hazard Area may be illustrated for guidance on reference maps but the boundary is the actual intersection of the applicable base flood elevation with the natural adjacent terrain of the watercourse or channel.
4. The Floodway boundary is as illustrated on the referenced maps and studies.
5. Any owner or lessee of property who believes his property has been inadvertently included in the Regulated Flood Hazard Area may submit scientific and/or technical information to the Flood Plain Administrator. Changes to the National Flood Insurance Rate Maps for the National Flood Insurance Program

through a FEMA Letter of Map Change process are the responsibility of the owner or lessee.

6. The Flood Plain Administrator may require elevation information performed by an engineer or land surveyor or other information as needed for any development that may be considered to be subject to these regulations. The Flood Plain Administrator's interpretation of the boundaries and decision may be appealed for the purpose of these regulations.

#### **4.3 ALTERATION OF JURISDICTIONAL AREA**

1. An alteration in this paragraph is a change of the existing boundary to the specific maps and data of the referenced studies in this Section that form the basis for the Regulated Flood Hazard Area.
2. An alteration may be the result of, new data and information or when technical or scientific flood data show that the base flood elevation has changed or was erroneously established and the boundaries of the Regulated Flood Hazard Area are incorrect.
3. Any alteration must be based on reasonable hydrological certainty.
4. Any alteration requires an amendment of the adopted jurisdictional area as well as approval of the DNRC.
5. Any notices required by FEMA for the purpose of updating flood insurance rate maps of changes as a result of permitted activity that cause a change in topography by fill or changes in the base flood elevation is the responsibility of the permit applicant. The Flood Plain Administrator may represent any necessary approvals or endorsements by the permit authority in the FEMA notice.
6. Alteration of a Floodway width or location cannot exceed a increase in flood heights of 0.5 feet or affect private property rights. The Flood Plain Administrator shall maintain a record of all alterations.
7. Permits must be required for all alterations other than naturally caused changes or changes due to errors.
8. An alteration is not required when property located within the Regulated Flood Hazard Area is shown to be naturally above the base flood elevation.
9. Except in a Flood Fringe, alteration approval from DNRC is required if property is to be raised to a level above the Base Flood Elevation by suitable fill and

where the encroachment by the fill causes a rise in the Base Flood Elevation of more than 0.5 feet. No portion of the fill may be within the floodway.

10. No alteration of a Regulated Flood Hazard Area is required when property located within the Regulated Flood Hazard Area is elevated with fill to at or above the base flood elevation as permitted.
11. The addition of fill does not alter the jurisdictional area unless approved as an alteration.

## SECTION 5. USES ALLOWED WITHOUT A PERMIT WITHIN THE JURISDICTIONAL AREA

**5.1 - GENERAL** In addition to existing nonconforming uses and artificial obstructions established before the effective date of Flood Plain Hazard Management Regulations, the following **open space uses** shall be allowed without a permit in the Regulated Flood Hazard Area, provided that such uses are not prohibited by any other resolution or statute, do not require structures, and do not require alteration of the Flood Plain such as fill, grading, excavation or storage of materials or equipment.

1. Agricultural uses, not including related structures, such as tilling, farming, irrigation, ranching, harvesting, grazing, etc;
2. Accessory uses, not including structures, such as loading and parking areas, or emergency landing strips associated with industrial or commercial facilities;
3. Forestry, including processing of forest products with portable equipment;
4. Recreational vehicle use provided that they be on the site for fewer than 180 consecutive days or be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system with wheels intact, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions;
5. Residential uses such as lawns, gardens, parking areas, and play areas;
6. Maintenance of an existing open space uses or artificial obstructions;
7. Preventive Maintenance activities such as bridge deck rehabilitation and roadway pavement preservation activities are considered maintenance.
8. Public or private recreational uses not requiring structures such as picnic grounds, swimming areas, parks, campgrounds, golf courses, driving ranges, archery ranges, wildlife management and natural areas, alternative livestock ranches (game farms), fish hatcheries, shooting preserves, target ranges, trap

and skeet ranges, hunting and fishing areas, and hiking and horseback riding trails;

9. Fences such as those that have a low impact to the flow of water such as barbed wire fences and wood rail fences and shall not include permanent fences crossing channels;
10. Addition of highway guard rail, signing and utility poles along a roadway are allowed without a permit.
11. Irrigation and livestock supply wells, provided that they are located at least 500 feet from domestic water supply wells; with the top of casing 18" above the Base Flood Elevation.

## **SECTION 6. PROHIBITED USES, ACTIVITIES AND STRUCTURES WITHIN THE JURISDICTIONAL AREA**

**6.1 FLOODWAY** The following artificial obstructions and nonconforming uses are prohibited in the Floodway within the Regulated Flood Hazard Area:

1. A building or structure including alterations for living purposes, place of assembly or permanent use by human beings or commercial and industrial buildings, or mobile homes and manufactured homes;
2. A structure, fill or excavation that would cause water to be diverted from the Floodway, cause erosion, obstruct the natural flow of waters or reduce the carrying capacity of the Floodway. Except minor excavation or fill where compatible and related and incidental and allowed with a permitted use;
3. The construction or storage of an object (artificial obstruction) subject to flotation or movement during flood level periods;
4. Solid and Hazardous waste disposal and individual and multiple family sewage disposal systems unless otherwise allowed.
5. Storage of toxic, flammable, hazardous or explosive materials;
6. Cemeteries, mausoleums, or any other burial grounds.

**6.2 FLOOD FRINGE OR REGULATED FLOOD HAZARD AREA WITHOUT A FLOODWAY** The following artificial obstructions and nonconforming uses are prohibited in the Flood Fringe or Flood Plain without a Floodway of the Regulated Flood Hazard Area:

1. Solid and hazardous waste disposal;
2. Storage of toxic, flammable, hazardous or explosive materials;
3. Cemeteries, mausoleums, or any other burial grounds; and
4. Critical facilities, including buildings and associated facilities that provide essential community care and emergency operation functions such as schools, hospitals, and nursing home facilities, fire stations and police stations;

## SECTION 7 PERMIT APPLICATION REQUIREMENTS

### **7.1 GENERAL**

1. A permit is required within the Regulated Flood Hazard Area for a person to establish or alter an artificial obstruction, nonconforming use or development;
2. Artificial obstructions, nonconforming uses and uses not specifically listed in Section 9 and 10 requires a permit except as allowed without a permit in Section 5 or prohibited as specified in Sections 6;
3. A permit is required to reconstruct or repair an existing structure that has experienced substantial damage or substantial improvement; and
4. A permit is not required for existing artificial obstructions or nonconforming uses established in the Flood Plain before the effective date of floodplain management regulations.

### **7.2 REQUIRED INFORMATION**

The permit application shall include, but is not limited to the following:

1. A completed and signed Flood Plain Permit Application;
2. The required review fee;
3. Plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed project (i.e.; landscape alterations, existing and proposed structures, including the placement of manufactured homes, etc.) and the location of the foregoing in relation to the Regulated Flood Hazard Areas;
4. A copy of other required applicable permits which may include but is not limited to a 310 permit, SPA 124 permit, Section 404 Permit, a 318 Authorization, 401 Certification or a Navigable Rivers Land Use License or Easement from other

permits from federal, state, and local agencies, for the proposed floodplain project and must show that the application is not in conflict with other relevant and applicable permits; and

5. Additional information related to the specific use or activity that demonstrates the design criteria and construction standards are met or exceeded as specified in Section 9 and 10.

## **SECTION 8. APPLICATION EVALUATION**

### **8.1 APPLICATION REVIEW**

1. The Flood Plain Administrator shall review and evaluate the application and shall approve, approve with conditions, or deny the application within 60 days of receipt of a correct and complete application.
2. The Flood Plain Administrator shall determine whether the application contains the applicable elements required in these regulations and shall notify the applicant of the Flood Plain Administrator's determination.
3. If the application is found insufficient and if the applicant corrects the identified deficiencies and resubmits the application, the Flood Plain Administrator shall notify the applicant whether the resubmitted application contains all the elements required by these regulations, as applicable.
4. This process shall be repeated until the applicant submits a complete application containing all the elements required by these regulations, or the application is withdrawn.
5. If after a reasonable effort the Flood Plain Administrator determines that the application remains incomplete, the Flood Plain Administrator shall deny the application and notify the applicant of missing elements. No further action shall be taken on the application by the Flood Plain Administrator until the application is resubmitted.
6. A determination that an application contains the appropriate information for review does not ensure that the Flood Plain permit application will be approved or conditionally approved and does not limit the ability of the Flood Plain Administrator in requesting additional information during the review process.

## **8.2. NOTICE REQUIREMENTS FOR FLOOD PLAIN PERMIT APPLICATIONS:**

Upon receipt of a complete application for a permit, the Flood Plain Administrator shall:

1. Prepare a notice containing the facts pertinent to the application and shall publish the notice at least once in a newspaper of general circulation in the area;
2. Serve notice by first-class mail upon adjacent and other impacted property owners.
3. The State National Flood Insurance Program Coordinator located in DNRC shall also receive notice by the most efficient method. Notice to other stream activities permitting agencies shall also be considered;
4. The notice shall provide a reasonable period of time, not less than 15 days, for interested parties to submit comments on the proposed activity;
5. Prior to any alteration or relocation of a watercourse of the Regulated Flood Hazard Area, additionally provide notice to FEMA and adjacent communities.

## **8.3 PERMIT CRITERIA**

Permits shall be granted or denied on the basis of whether the proposed new construction, substantial improvement, or alteration of an artificial obstruction is not a prohibited use and meets the requirements of the minimum standards and criteria in Section 9 and 10.

The Flood Plain Administrator must determine that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendment of 1972.

## **8.4 DECISION**

The Flood Plain Administrator shall approve, conditionally approve, or deny the proposed application. The Flood Plain Administrator shall notify the applicant of his action and the reasons thereof within 60 days of receipt of a correct and complete application unless otherwise specified. A copy of the permit must be provided to DNRC.

The granting of a permit does not affect any other type of approval required by any other statute or ordinance of the state, any political subdivision or the United States but is an added requirement

## **8.5 FLOOD PLAIN PERMIT APPLICATION APPROVAL**

Upon approval or conditional approval of the Flood Plain permit application, the Flood Plain Administrator shall provide the applicant with a permit including but not limited to the following requirements and conditions:

1. The Flood Plain permit will become valid when all other necessary permits are in place.
2. Set forth the time limit of up to one year or as commensurate with the project construction time line for completion of the project or development. The applicant may request an extension for completion for up to an additional year. The request must be made at least 30 days prior to the completion deadline;
3. The permittee shall notify all subsequent property owners and their agents and potential buyers of the Flood Plain development permit issued on the property and that such property is located within a Regulated Flood Hazard Area;
4. Maintain the obstruction or use to comply with the conditions and specifications of the permit;
5. Submit a certificate of compliance report and elevation certificate where applicable within 30 days of completion or other time as specified; and
6. Require FEMA approval of revisions that affected National Flood Insurance Rate Map.

## **SECTION 9. DEVELOPMENT STANDARDS IN THE FLOODWAY**

**9.1 GENERAL STANDARDS** The application must demonstrate the following goals and criteria are considered and incorporated into the design of any use or artificial obstruction in the Floodway requiring a permit:

1. All projects in the Floodway where specifically required herein as requiring an encroachment analysis, must undergo a through hydrologic and hydraulic analysis prepared by an engineer to demonstrate their effect on flood flows, velocities and the Base Flood Elevation.
2. A conditional approval from FEMA of any proposed increase of more than zero (0.00) feet in the Base Flood Elevation must accompany the application. An application for a FEMA Conditional Letter of Map Revision approval requires a supporting encroachment analysis.



3. The maximum allowable increase to the Base Flood Elevation is one half foot (0.50), unless approval of an alteration of the Regulated Flood Hazard Area pursuant to Section 4 occurs with approval of the permit.
2. Projects must assure that the carrying capacity of the altered or relocated watercourse is maintained.
3. Projects must be designed and constructed to ensure that they do not increase the flood hazard on other properties (cite) and be reasonably safe from flooding.
4. The danger to life and property due to backwater or diverted flow caused by the obstruction or use;
5. The danger that the obstruction or use may be swept downstream to the injury of others;
6. The availability of alternative locations;
7. The construction or alteration of the obstruction or use in such manner as to lessen the flooding danger;
8. The permanence of the obstruction or use;
9. The anticipated development in the foreseeable future of the area which may be affected by the obstruction or use;
10. The safety of access to property in times of flooding for ordinary and emergency services;
11. Relevant and related permits for the project have been obtained;
12. Projects must conform to the additional minimum standards and provisions of this ordinance as specified for the use or artificial obstruction specified herein; and
13. Such other factors as are in harmony with the purposes of these regulations, the Montana Flood Plain and Floodway Management Act, and the accompanying Administrative Rules of Montana. (MCA 76-5-406) (ARM 36.15.216(2)(g).

**9.2 MINING OF MATERIAL REQUIRING EXCAVATION FROM PITS OR POOLS** provided that:

1. A buffer strip of undisturbed land of sufficient width as determined by an engineer to prevent flood flows from channeling into the excavation is left between the edge of the channel and the edge of the excavation;

2. The excavation meets all applicable laws and regulations of other local and state agencies; and
3. Excavated material may be processed on site but is stockpiled outside the Flood Plain.

**9.3 RAILROAD, HIGHWAY AND STREET STREAM CROSSINGS** provided that:

1. Crossings are designed to offer minimal obstructions to the flood flow;
2. Where failure or interruption of public transportation facilities would result in danger to public health or safety and where practicable and in consideration of FHWA Federal-Aid Policy Guide 23CFR650A:
  1. Bridge lower chords shall have freeboard to at least two (2) feet above the Base Flood Elevation to help pass ice flows, the base flood discharge and any debris associated with the discharge; and
  2. Culverts are designed to pass the base flood discharge and maintain at least two (2) feet freeboard on the crossing surface.
3. If possible, normal overflow channels are preserved to allow passage of sediments to prevent aggradations;
4. Mid stream supports for bridges, if necessary, have footings buried below the maximum scour depth; and
5. An encroachment analysis is prepared by an engineer.

**9.4 LIMITED FILLING FOR ROAD, AND RAILROAD EMBANKMENTS** not associated with stream crossings and bridges provided that:

1. The fill is the suitable fill;
2. Reasonable alternate transportation routes outside the floodway are not available;
3. The encroachment is located as far from the stream channel as possible;
4. The project includes mitigation of impacts to other property owners in the vicinity of the project and the natural stream function; and
5. An encroachment analysis is prepared by an engineer.

**9.5 BURIED OR SUSPENDED UTILITY TRANSMISSION LINES** provided that:

1. Suspended utility transmission lines are designed such that the lowest point of the suspended line is at least six (6) feet higher than the Base Flood Elevation;

2. Towers and other appurtenant structures are designed and placed to withstand and offer minimal obstruction to flood flows;
3. When technically feasible, the crossing will not disturb the bed and banks of the stream and alternatives such as alternative routes, directional drilling, and aerial crossings are considered; and
4. Utility transmission lines carrying toxic or flammable materials are buried to a depth of at least twice the calculated maximum scour depth determined by an engineer for the base flood.

**9.6 STORAGE OF MATERIALS AND EQUIPMENT** provided that:

1. The material or equipment is not subject to major damage by flooding and is properly anchored to prevent flotation or downstream movement; and
2. The material or equipment is readily removable within the limited time available after flood warning. Storage of flammable, toxic or explosive materials shall not be permitted.

**9.7 DOMESTIC WATER SUPPLY WELLS** provided that:

1. They are driven or drilled wells located on ground higher than surrounding ground to assure positive drainage from the well;
2. They require no other structures (e.g. a well house);
3. Well casings are water tight to a distance of at least twenty five (25) feet below the ground surface and the well casing height shall be a minimum of eighteen (18) inches above the base flood elevation;
4. Water supply and electrical lines have a watertight seal where the lines enter the casing;
5. All pumps and electrical lines and equipment are either of the submersible type or are adequately flood proofed; and
6. Check valves are installed on main water lines at wells and at all building entry locations.

**9.8 BURIED AND SEALED VAULTS FOR SEWAGE DISPOSAL IN CAMPGROUNDS AND RECREATIONAL AREAS** provided they meet applicable laws and standards administered by Montana Department of Environmental Quality. Only those **wastewater disposal systems** that meet the requirements and separation distances are allowed.

**9.9 PUBLIC AND PRIVATE CAMPGROUNDS** provided that:

1. Access roads require only limited fill and do not obstruct or divert flood waters;  
Meet the accessory structures requirements;
2. An encroachment analysis must be prepared by an engineer;
3. No dwellings or permanent mobile homes are allowed;
4. Recreational vehicles and travel trailers are ready for highway use with wheels intact, with only quick disconnect type utilities and securing devices, and have no permanently attached additions;
  5. There is no large-scale clearing of riparian vegetation within 50 feet of the mean annual high water mark.

**9.10 STRUCTURES ACCESSORY OR APPURTENANT** to permitted uses such as boat docks, loading and parking areas, marinas, sheds, emergency airstrips, permanent fences crossing channels, picnic shelters and tables and lavatory, provided that:

1. The structures are not intended for human habitation or supportive of human habitation;
2. If the structures are substantial as determined by the permit issuing authority, an encroachment analysis must be prepared by an engineer.
3. The structures will, insofar as possible, be located on ground higher than the surrounding ground and as far from the channel as possible;
4. Only those wastewater disposal systems that meet the requirements and separation distances under are allowed;
5. Service facilities within these structures such as electrical, heating and plumbing are flood proofed;
6. Structures are firmly anchored to prevent flotation;

7. The structures do not require fill and/or substantial excavation;
8. No large scale clearing of riparian vegetation within 50 feet of the mean annual high water mark, and;
9. The structures or use cannot be changed or altered without permit approval.

**9.11 CONSTRUCTION OF OR MODIFICATIONS TO SURFACE WATER DIVERSIONS** provided that the design is prepared by an engineer and includes:

1. An encroachment analysis is prepared by an engineer.
2. Minimize potential erosion from a base flood;
3. Safely withstand up to the base flood; and construction is under the supervision of an engineer.

**9.12 FLOOD CONTROL AND BANK PROTECTION MEASURES** Must be designed by an engineer and constructed to withstand the flood depths, hydrodynamic and hydrostatic pressures, velocities, impact, buoyancy, and uplift forces associated with the base flood and include an encroachment analysis. The design shall also show compliance with the following additional criteria:

- 1. LEVEE AND FLOODWALL** construction or alteration:
  1. The proposed construction or alteration of a levee or floodwall must be designed and constructed with suitable fill and to safely convey a base flood;
  2. Except to protect agricultural land only, are constructed at least 3 feet higher than the elevation of the base flood;
  3. Unless to protect only agricultural land, protection of structures of more than one land owner requires engineering and construction to meet state and federal levee standards and be publically owned for the purpose of construction, operation and maintenance; and
  4. For any increase in the elevation of the base flood the following information must be provided:
    1. The estimated cumulative effect of other reasonably anticipated future permissible uses;
    2. The type and amount of existing flood prone development in the affected area; and
    3. Impacts to existing or foreseeable development.
- 2. BANK STABILIZATION PROJECTS, PIER AND ABUTMENT PROTECTION** projects if:

1. The Materials for the project should be the least environmentally damaging and practicable designed to withstand a base flood within 5 years or other time as required by the Flood Plain Administrator and does not require substantial yearly maintenance after that period.
2. Materials for the project may be designed to erode over time but not fail catastrophically and impact others. Erosions and raveling of the materials may be designed to be a least similar in amount and rate to existing natural stream banks during the base flood.
3. The project must not increase erosion upstream, downstream, or adjacent to the site.
4. Materials for the project may include but not limited to rip rap, root wads, brush mattresses, willow wadding, woody debris or combinations of analogous materials.
5. The streams biological capacity and habitat potential shall be incorporated in the project design.
6. The project includes compensating efforts by replacing and providing substitute resources or environments through creation, restoration, enhancement or preservation of similar or appropriate resource areas.

3. **CHANNELIZATION PROJECTS** where the excavation and/or construction of an artificial channel is for the purpose of diverting the entire flow of a stream from its established course and provided the projects do not increase velocity to a level that will cause erosion.

4. **DAMS** provided:

1. The design and construction is in accordance with the Montana Dam Safety Act and applicable safety standards; and

2. Will not increase flood hazards downstream either through operational procedures or improper hydrologic/hydraulic design.

**9.13 STREAM AND BANK RESTORATION** projects intended to reestablish the terrestrial and aquatic attributes of a natural stream and not for protection of a structure or development if:

1. The project design must be reviewed and approved by an engineer.
2. An encroachment analysis is performed by an engineer.

3. Not increase erosion upstream, downstream, or adjacent to the site.
4. Materials may include but are not limited to rip rap, root wads, brush mattresses, willow wadding, woody debris or combinations of analogous materials.
5. Erosions and raveling of the materials are similar in amount and rate to existing natural stream banks during the base flood.
6. Meets the terrestrial and aquatic resource capabilities of the area.

## **SECTION 10. DEVELOPMENT STANDARDS - FLOOD FRINGE OR REGULATED FLOOD HAZARD AREA WITH NO FLOODWAY**

**10.1 USES REQUIRING PERMITS** – All uses allowed by permit in the Floodway shall also be allowed by permit within the Flood Fringe or Regulated Flood Hazard area with no Floodway. Additionally, new construction, substantial improvements, alterations to structures (including, but not limited to residential, commercial, agricultural and industrial, and suitable fill shall be allowed by permit subject to the minimum development standards in the General Standards in Section 9.1 and this section.

### **10.2. GENERAL REQUIREMENTS are:**

1. **Base Flood Elevation** The appropriate base flood elevation(s) shall be determined by appropriate methods and utilized in the design and layout of the project by an engineer demonstrating the appropriate design and construction criteria herein are met. Regulated Flood Hazard Areas that do not have computed and published base flood elevations in the adopted flood hazard study referenced in Section 4, Jurisdictional Area, must be computed as well, utilizing appropriate engineering methods and analysis;
2. **Flood Damage** Projects must be constructed by methods and practices that minimize flood damage and are reasonably safe from flooding;
3. **Materials** Structures are reasonably safe from flooding and constructed with materials resistant to flood damage;
3. **Structures or fill** Structures or fill must not be prohibited by any other statute, regulation, ordinance, or resolution; and must be compatible with subdivision, zoning and any other land use regulations, if any;

4. **Anchoring** All construction and substantial improvements shall be designed and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

5. **Certification** Certification by an engineer, architect, or other qualified person

6. must accompany the application as to an encroachment analysis where required, adequacy of structural elevations, determination of the base flood elevation, flood-proofing, wet proofing, dry proofing, design and construction to withstand the flood depths, hydrodynamic and hydrostatic pressures, velocities, impact, buoyancy, and uplift forces associated with the base flood. A certification is not intended to constitute a warranty or guarantee of performance, expressed or implied;

7. **Access** Structures must have safe access during times of flooding up to the base flood for ordinary and emergency services provided there are no reasonable alternate locations for structures;

8. **Encroachment Limit** Allowable encroachment for developments in the Regulated Flood Hazard Area without a Floodway must be supported by an encroachment analysis and cannot exceed 0.5 feet increase to the Base Flood Elevation. An encroachment analysis is not required for any development in the Flood Fringe where an accompanying Floodway has been designated within the Regulated Flood Hazard Area;

9. **Electrical Systems**

1. All incoming power service equipment including all metering equipment, control centers, transformers, distribution and lighting panels and all other stationary equipment must be located at least two feet above the Base Flood Elevation.

2. Portable and movable electrical equipment may be placed below the elevation of the Base Flood Elevation, provided that the equipment can be disconnected by a single plug and socket assembly of the submersible type;

3. The main power service lines must have automatically operated electrical disconnect equipment or manually operated electrical disconnect equipment located at an accessible remote location outside the Flood Plain or two feet above the BFE; and

4. All electrical wiring systems installed below the base flood elevation must be suitable for continuous submergence and may not contain fibrous components.



**10. Heating and Cooling Systems**

1. Be installed with float operated automatic control valves so that fuel supply is automatically shut off when flood waters reach the floor level where located;
2. Have manually operated gate valves installed in gas supply lines. The gate valves must be operable from a location above the Base Flood Elevation;
3. Be installed in accordance with the provisions of Electrical Systems Flood proofing; and
4. Have furnaces and cooling units and ductwork installed at least two (2) feet above the Base Flood Elevation.

**11. Plumbing Systems**

1. Sewer lines, except those to be buried and sealed, must have check valves installed to prevent sewage backup into permitted structures; and
2. All toilets, stools, sinks, urinals, vaults, and drains must be located so the lowest point of possible entry is at least two (2) feet above the Base Flood Elevation.

**12. Structural Fill:** Fill used to elevate structures, including but not limited to residential, commercial, and industrial structures must be suitable and meet the following requirements:

1. The filled area is at or above the Base Flood Elevation and extends at least 15 feet beyond the structure in all directions;
  2. The fill must be a minimum of 0.5 feet above the Base Flood Elevation.
  3. The fill is compacted to minimize settlement and to 95 percent of the maximum density. Compaction of earthen fill must be certified by a registered professional engineer;
  4. No portion of the fill is within the floodway or the estimated floodway if none has been designated;
  5. The fill slope must not be steeper than 1 ½ horizontal to 1 vertical unless substantiating data justifying a steeper slope is provided and adequate erosion protection is provided for fill slopes exposed to floodwaters. The erosion protection for fill slopes exposed to velocities of four feet per second and less may consist of vegetative cover consisting of grasses or similar undergrowth as approved by the permit issuing authority. Slopes exposed to velocities greater than four feet per second shall be protected by armoring with stone or rock slope protection.
13. Mitigation may be required for lost natural flood storage due to added fill.

#### 14. Water And Sewage Systems

All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other services designed and located so as to prevent waters from entering or accumulating within the components during conditions of flooding or to prevent impairment or contamination during flooding.

**10.3. RESIDENTIAL REQUIREMENTS** New construction, alterations, and substantial improvements of residential dwellings including manufactured homes and recreational vehicles on site for more than 180 consecutive days must be constructed such that:

1. The lowest floor elevation (including basement) including electrical, heating, duct work, ventilation, plumbing and air conditioning equipment and other services is two (2) feet above the Base Flood Elevation. Elevating may be by either suitable fill, stem walls, pilings or other acceptable means;
2. Crawl spaces must be designed so that the crawl space floor is at or above the Base Flood Elevation. Crawl spaces having an inside dimension of more than five (5) feet from the ground to the living floor level must meet the requirements in this section for a basement;
3. Where existing streets, utilities, lot dimensions, or additions onto existing structures, make strict compliance with these provisions impossible, a lesser amount of fill or alternative flood proofing measures may be permitted only by variance approval;
4. All **manufactured homes** for residential use shall:
  1. Use methods and practices which minimize flood damage;
  2. Elevate the lowest floor two (2) feet above the base flood elevation;
  3. Elevate on suitable fill or raised on a permanent foundation;
  4. Have a foundation consisting of reinforced concrete, reinforced-mortared block, reinforced piers, or other foundation elements of equal strength; and
  5. Secure the chassis, including additions by anchoring to the foundation system so that it will resist flotation, collapse or lateral movement. Anchoring may include, but are not limited to:
    1. Over-the-top ties to ground anchors be provided at each of the four (4) corners of the mobile home, with two additional

- ties per side at intermediate locations for manufactured homes less than fifty (50) feet long;
  - 2. Frame ties to ground anchors be provided at each corner of the home with five (5) additional ties per side at intermediate points, for manufactured homes more than fifty (50) feet long; and
  - 3. Components of the anchoring system capable of carrying a force of 4,800 pounds.
6. Adequate surface drainage and access for a hauler.

**10.4 NON-RESIDENTIAL REQUIREMENTS** New construction, alterations, and substantial improvements of commercial and industrial buildings must be constructed on suitable fill stem walls, pilings or other suitable means such that the lowest floor elevation (including basement) is two (2) feet above the Base Flood Elevation, or the building must be adequately dry or wet flood proofed to an elevation no lower than two (2) feet above the Base Flood Elevation.

1. **Wet Flood proofing:** Building designs to allow internal flooding of the lowest floor must:
  1. Limit uses to parking, loading areas, and storage of equipment or materials not appreciably affected by floodwaters;
  2. Use materials for walls and floors that are resistant to flooding to an elevation two (2) feet or more above the Base Flood Elevation;
  3. Equalize hydrostatic forces on walls by designing for entry and exit of floodwaters that include screens, louvers, valves, and other coverings or devices that:
    1. Automatically allow entry and exit of floodwaters;
    2. Have two(2) or more openings with a total net area of not less than one(1) square inch for every one(1)square foot of enclosed area subject to flooding; and
    3. Have the bottom of all openings no higher than one(1) foot above grade.
2. **Dry Flood proofing** Buildings designs that not allow internal flooding of the lowest floors must be::
  1. Used for a purpose other than parking, loading, or storage of materials resistant to flooding shall be dry flood proofed;
  2. Flood proofed to an elevation no lower than two (2) feet above the BFE;

3. Constructed of impermeable membranes or materials for floors and walls and watertight enclosures for all windows, doors and other openings; and
  4. Designed to withstand the hydrostatic pressures and hydrodynamic forces resulting from the base flood.
3. **Except for Manufactured homes** proposed for use as commercial or industrial buildings cannot be wet or dry flood proofed;
  4. **Except for Agricultural Structures** used solely for agricultural purposes and used exclusively in connection with the production, harvesting, storage, drying, or raising agricultural commodities including raising of livestock, not be intended for human habitation, and having low flood damage potential shall:
    1. Be located on higher ground and as far from the channel as possible;
    2. Offer minimum obstruction to flood flows;
    3. Be adequately anchored to prevent flotation or collapse;
    4. Where electrical, heating and plumbing systems are installed, must flood proofing requirements in this Section; and
    5. Meet the elevation or dry flood proofing requirements if the structure is an animal confinement facility.

## **SECTION 11. EMERGENCIES**

### **11.1 General**

Emergency repair and replacement of severely damaged artificial obstructions and development including public transportation facilities, public water and sewer facilities, flood control works, and private projects in the Regulated Flood Hazard Area are subject to the permitting requirements of these regulations.

The provisions of these regulations are not intended to affect other actions that are necessary to safeguard life or structures during periods of emergency.

### **11.2 Emergency Application Requirements**

1. Prior to any action, the property owner and or the person responsible for taking emergency action shall notify the Flood Plain Administrator and follow-up by submitting an Emergency Notification Form within five (5) days of the action taken as a result of an emergency.
2. Unless otherwise specified by the Flood Plain Administrator, within 30 days of initiating the emergency action, a person who has undertaken an emergency action must submit a Flood Plain Permit Application that describes what action has taken place during the emergency and describe any additional work that may be required to bring the project in compliance with these regulations.

### **11.3 Permit Evaluation**

1. A person who has undertaken an emergency action may be required to modify or remove the project in order to meet the permit requirements.

## **SECTION 12. VARIANCES**

**12.1 GENERAL** - A variance from the minimum development standards of these regulations may be allowed. An approved variance would permit construction in a manner otherwise as required or prohibited by these regulations.

### **12.2 VARIANCE APPLICATION REQUIREMENTS:**

1. A completed Flood Plain Permit Application and required supporting material must be submitted.
2. Additionally, a completed Variance Application specific to the variance request including facts and information addressing the criteria in this section must be submitted; and
3. If the Flood Plain permit application and variance application is deemed not correct and complete, the Flood Plain Administrator shall notify the applicant of deficiencies within a reasonable time not to exceed 30 days. Under no circumstances should it be assumed that the variance is automatically granted.

### **12.3 NOTICE REQUIREMENTS FOR FLOOD PLAIN VARIANCE APPLICATION**

Public Notice of the Flood Plain Permit and Variance Application shall be given pursuant to Section 8.2.

### **12.4 EVALUATION OF VARIANCE APPLICATION**

1. A variance shall only be issued upon a determination that the variance is the minimum allowance necessary, considering the flood hazard, to afford relief from these regulations and provided all of the findings are met:
  1. There is a good and sufficient cause;
  2. Failure to grant the variance would result in exceptional hardship to the applicant; There are no basements nor residential dwelling that has the lowest floor elevation below the Base Flood Elevation.

3. Crawl Spaces floor are no more than two ( 2) feet below the exterior lowest adjacent grade and must have an inside dimension from interior ground to the bottom of the living floor of less than five (5) feet. The crawl spaces must meet the dry flood proofing requirements in Section 10.4.1.
4. Granting of a variance will not result in increased flood heights to existing insurable buildings, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with other existing local laws or ordinances;
5. The proposed use is adequately flood proofed;
6. The variance is the minimum necessary, considering the flood hazard, to afford relief;)
7. Reasonable alternative locations are not available;
8. There is no danger to life and property by water that may be backed up or diverted by the obstruction or use;
9. There is no danger that the obstruction or use will be swept downstream to the injury of others;
10. Incorporates measures in the construction or alteration of the obstruction or use that lessens the danger;
11. The permanence of the obstruction or use;
12. There is no adverse affect to anticipated development in the foreseeable future of the area that may be affected by the obstruction or use;
13. There is no adverse affect to existing properties or structures; and
14. Any increase to the Base Flood Elevation in a Floodway has been approved by FEMA for flood insurance purposes and any increase to the Base Flood Elevation in the Floodway or Flood Plain of more than 0.5 feet is an alteration of the Regulated Flood Hazard Area has been duly amended pursuant to Section 4.

2. Special Considerations for variance approval:

1. If the new construction or substantial improvements on a lot of one-half acres or less is contiguous to and surrounded by lots of existing structures constructed below the base flood elevation, a variance may be approved. However, as lot sizes increase beyond one-half acre additional technical justification may be required;
2. Historic Structures – variances may be issued for the repair or rehabilitation of historic structures upon a determination that the

proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum relief necessary to preserve the historic character and design of the structure.

### **3. 12.5 DECISION**

1. The Board of County Commissioners shall:
  1. Evaluate the application using the criteria and findings in this section, the application requirements and minimum development standards in Section 9 and 10;
  2. Hear, make findings, and approve, conditionally approve or deny a variance within 60 days of a complete application.
  3. Attach conditions to the granting of variance including a project completion date and inspections during and after construction.
  4. Notify the applicant that the issuance of a variance to construct a structure below the base flood level may result in increased premium rates for flood insurance and that flood insurance premiums are determined by actuarial risk and will not be modified by the granting of a variance .
  5. Grant approval only if the jurisdictional area of the Regulated Flood Hazard Area has been approved pursuant to Section 4.3, Alteration of Jurisdictional Area.
2. The Flood Plain Administrator shall maintain a record of all actions involving a variance, including the Board's findings and decision and shall send a copy of each variance granted to DNRC.
3. The Flood Plain Administrator shall report such variances issued in the biennial report submitted to FEMA.

### **12.6 JUDICIAL REVIEW**

Any person or persons aggrieved by the variance decision may appeal such decision in the courts of competent jurisdiction.

## **SECTION 13. APPEALS**

**13.1 GENERAL** An appeal is a formal review by the Board of County Commissioners of the Flood Plain Administrator's order, or granting or denial of a flood plain development permit.

**13.2 APPEALS REQUIREMENTS** - An Appeal to the Board shall include:

1. An appeal shall include the basis of the appeal and supporting information including specific findings and conclusions of the Flood Plain Administrator's decision being appealed;
2. An appeal must be submitted by an applicant or anyone who may be aggrieved by the Flood Plain Administrator's decision or order;
3. Appeals must be received within 30 days of the date of the decision or order of the Flood Plain Administrator; and
4. Additional information specific to the appeal request may be requested.

### **13.3 NOTICE AND HEARING**

1. Notice of the pending appeal and public hearing shall be provided pursuant to Section 8.2. The Flood Plain Administrator may notify DNRC and FEMA of pending appeals.
2. A public hearing must be held within 30 days of the Notice unless set otherwise.

### **13.4 DECISION**

A judgment on an appeal shall be made within 30 days of the hearing unless set otherwise. The decision must grant the permit, modify or deny the permit or remand the application to the Flood Plain Administrator with instructions or directions. A decision on an appeal of a permit cannot grant or issue a variance.

### **13.5 JUDICIAL REVIEW**

Any person or persons aggrieved by the decision may appeal such decision in the courts of competent jurisdiction.



## SECTION 14. ENFORCEMENT

- 14.1. INVESTIGATION REQUEST** An investigation of an artificial obstruction or nonconforming use within the Regulated Flood Hazard Area may be made either on the initiative of the Flood Plain Administrator or on the written request of three titleholders of land which may be affected by the activity within the Regulated Flood Hazard Area. The names and addresses of the persons requesting the investigations shall be released if requested.
- 14.2. NOTICE TO ENTER AND INVESTIGATE LANDS OR WATERS** The Flood Plain Administrator may make reasonable entry upon any lands and waters for the purpose of making an investigation, inspection or survey to verify compliance with these regulations.
1. The Flood Plain Administrator shall provide notice of entry by mail, electronic mail, phone call, personal delivery to the owner, owner's agent, lessee, or lessee's agent whose lands will be entered.
  2. If none of these persons can be found, the Flood Plain Administrator shall affix a copy of the notice to one or more conspicuous places on the property for five (5) days.
  3. If the owners do not respond, cannot be located or refuse entry to the Flood Plain Administrator, the Flood Plain Administrator may only enter the property through a Search Warrant.
- 14.3. NOTICE TO RESPOND AND ORDER TO TAKE CORRECTIVE ACTION** When the Flood Plain Administrator determines that a violation may have occurred, the Flood Plain Administrator may issue written notice to the owner or an agent of the owner, either personally or by certified mail. Such notice shall cite the regulatory offense and include an order to take corrective action within a reasonable time or respond requesting an administrative review.
- 14.4. ADMINISTRATIVE REVIEW** The order is final, unless within five (5) working days or any granted extension, after the order is received, the owner submits a written request for an administrative review before the Flood Plain Administrator. A request for an administrative review does not stay the order.
- 14.5. APPEAL OF ADMINISTRATIVE DECISION** Within ten (10) working days or any granted extension of receipt of the Flood Plain Administrator's decision concluding the administrative review, the property owner or owner's agent may appeal the decision to the Board.
- 14.6. FAILURE TO COMPLY WITH ORDER TO TAKE CORRECTIVE ACTION** If the owner fails to comply with the order for corrective action, remedies may include administrative or legal actions, or penalties through court.

**14.7. JUDICIAL REVIEW** Any person aggrieved by the decision may appeal the decision to a court of competent jurisdiction.

**14.8. OTHER REMEDIES** This section does not prevent efforts to obtain voluntary compliance through warning, conference, or any other appropriate means. Action under this part shall not bar enforcement of these regulations by injunction or other appropriate remedy.

## **SECTION 15. PENALTIES**

**15.1 MISDEMEANOR** Violation of the provisions of these regulations or failure to comply with any of the requirements, including failure to obtain permit approval prior to development in the Regulated Flood Hazard Area, shall constitute a misdemeanor and may be treated as a public nuisance.

Any person who violates these regulations or fails to comply with any of its requirements shall, upon conviction thereof, be fined not more than \$100 per day. Each day's continuance of a violation shall be deemed a separate and distinct offense.

### **15.2 DECLARATION TO THE FEDERAL FLOOD INSURANCE**

**ADMINISTRATOR** Upon finding of a violation and failure of the owner to take corrective action as ordered, the Flood Plain Administrator may submit notice and request a 1316 Violation Declaration to the Federal Insurance Administrator. The Federal Insurance Administrator has the authority to deny new and renewal of flood insurance policies for a structure upon finding a valid violation declaration.

The Flood Plain Administrator shall provide the Federal Insurance Administrator the following declaration:

1. The name(s) of the property owner(s) and address or legal description of the property sufficient to confirm its identity and location;
2. A clear and unequivocal declaration that the property is in violation of a cited State or local law, regulation or ordinance;
3. A clear statement that the public body making the declaration has authority to do so and a citation to that authority;
4. Evidence that the property owner has been provided notice of the violation and the prospective denial of insurance; and
5. A clear statement that the declaration is being submitted pursuant to section 1316 of the National Flood Insurance Act of 1968, as amended.

Appendix E  
Construction  
Certification Checklist



**LEWIS AND CLARK COUNTY  
TESTS AND SPECIFICATIONS FOR SUBDIVISIONS AND INFRASTRUCTURE IMPROVEMENTS  
MATERIALS TESTING AND SUBMITTAL CHECKLIST**

Reference	Description	Frequency	Contractor and or Subdivider Responsibility	Information Submitted Yes No
<b>SUBGRADE AND BASE AGGREGATES</b>				
ASTM D1883	California Bearing Ratio	1 per mile if soil classification changes	X	
AASHTO T99	<b>Subgrade:</b> Moisture Density	1 per soil type	X	
AASHTO T99, T11, T27, T89, T90	<b>Select Base:</b> Moisture Density, Agg. Gradation, Liquid and Plastic Limit	1 per aggregate type	X	
AASHTO T99, T11, T27, T89, T90	<b>Crushed Top Surfacing</b> Moisture Density, Agg. Gradation, Liquid and Plastic Limit	1 per aggregate type (Gravel road surfacing or paved surface)	X	
ASTM D2922, D3017	In-place field density	1 test per 300 lineal feet; each lift of subgrade, select base and top surfacing	X	
<b>AGGREGATE SOURCE ACCEPTANCE (SUBMITTAL ONLY REQUIRED)</b>				
If not using approved commercial source, then the following aggregate testing will be required.				
ASTM C131	Los Angeles Abrasion	1 per source	X	
ASTM C88	Sodium Sulfate Soundness	1 per source	X	
ASTM D4318	Atterberg Limits	1 per source	X	
ASTM D2419	Sand Equivalent	1 per source	X	
ASTM D5821	Fractured faces	1 per source	X	
ASTM D4791	Flats & Elongates	1 per source	X	
<b>BITUMINOUS PLANT MIX PAVING (1 LOT = 2000 Tons; 4-SUBLOTS of 500 Tons Each)</b>				
ASTM	Bitumen Certifications	Each Tanker	X	
Asphalt Institute MS-2	Job Mix Formula <b>(Submittal Only)</b>	One per oil type and aggregate source	X	
ASTM D6926/6927 AATM D2041	Marshall Density, Stability and Flow, Air Voids	2 per lot	X	
ASTM D6307 AASHTO T30	Asphalt Content by Ignition Furnace Method Agg. Gradation from Ignition burnout	2 per lot 2 per lot	X X	
AASHTO T329	Moisture content of bituminous mixture by oven method	1 time per lot	X	
ASTM C566 & D1461	Moisture Content of Aggregate & Mixture	1 per lot	X	
ASTM D2726	Cored Bulk Specific Gravity	1 set of 2 cores per 1000 Ton 4" diameter cores	X	
ASTM D3549	Thickness of Cores	Thickness on all cores	X	
Asphalt Institute MS-2	Voids in Mineral Aggregate (VMA)	Calculated 2 times per lot	X	
ASTM D2950	Nuclear In-Place Density	As necessary to achieve specified density <b>Acceptance for density is by cores only</b>	X	

**One lot consists of one days production not to exceed 2,000 tons. Partial lots will be considered for mechanical break down, or shut down due to weather.**



# Appendix F

## Weed Permits







# LEWIS AND CLARK COUNTY ROADSIDE WEED CONTROL PERMIT



Rev 06

Permit No. \_\_\_\_\_  
 JUNE \_\_\_\_ TO JUNE \_\_\_\_  
 Permit Period (5 Year max)

Resident Name: _____	Home phone: _____
Mail Address: _____	Cell/Work phone: _____
City: _____	State: _____ ZIP: _____

Sign Location: \_\_\_\_\_

Distance between signs: \_\_\_\_\_ Do you own the property?  Yes  No

If you are not the landowner please complete:

Landowner Name: _____
Mail Address: _____
City: _____ State: _____ ZIP: _____

I agree to install and maintain the "**Roadside Weed Control by Landowner**" signs as stated in the instructions (on back). If I am negligent in doing so, I agree to bear the loss or damage that may inadvertently occur as a result of my negligence.

I also agree to control and prevent from propagating any and all noxious weeds listed on the Lewis and Clark County Noxious Weed List. Failure to do so within seven (7) calendar days from receiving written notice from the Lewis and Clark County Weed District will make this agreement null and void, and the Lewis and Clark County Weed District will control the noxious weeds by the most economical and direct means.

**THIS AGREEMENT IS FOR A FIVE-YEAR PERIOD**

\_\_\_\_\_  
 Applicant's Signature

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Landowner's Signature (if Applicant is a Renter)

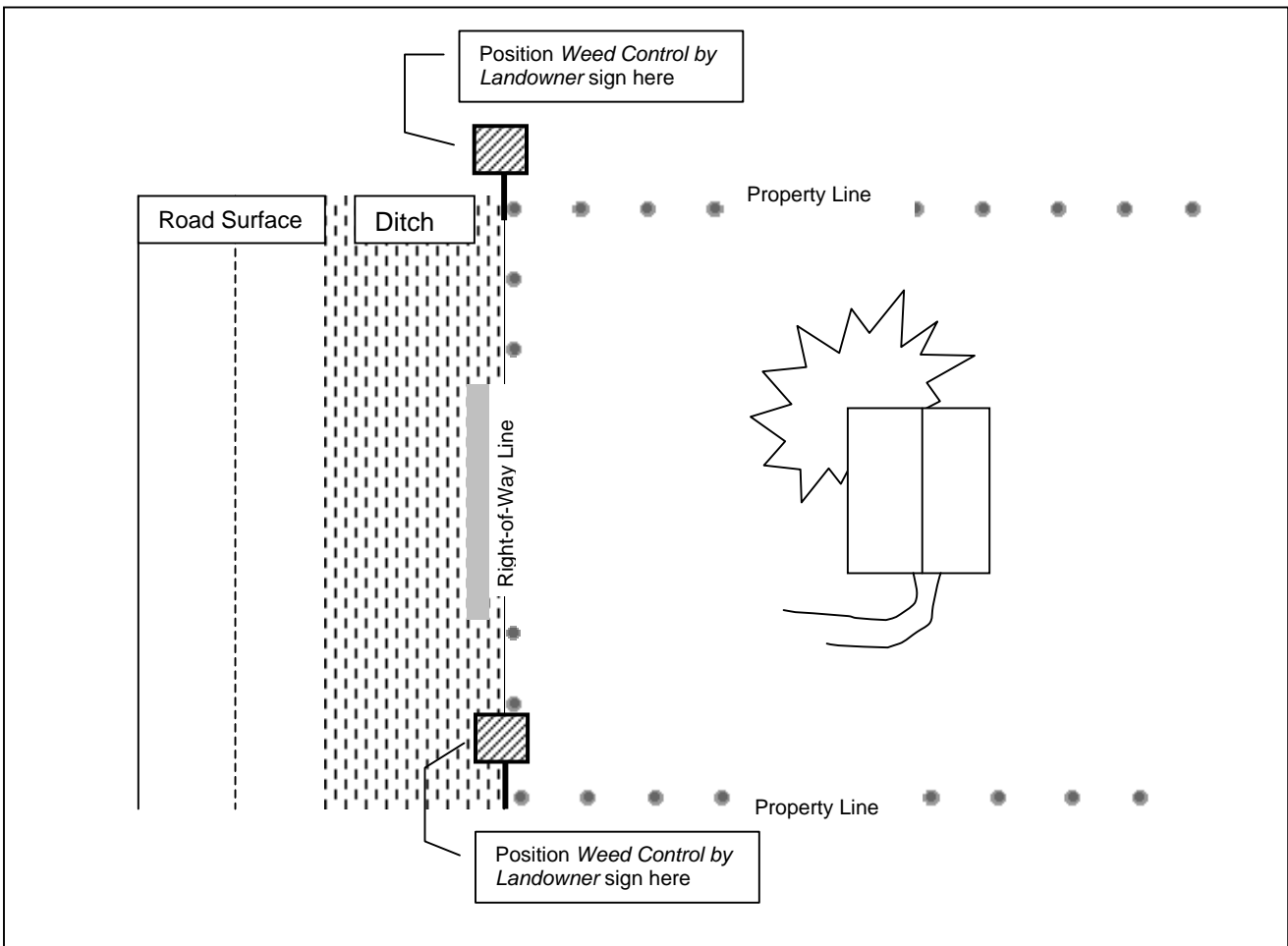
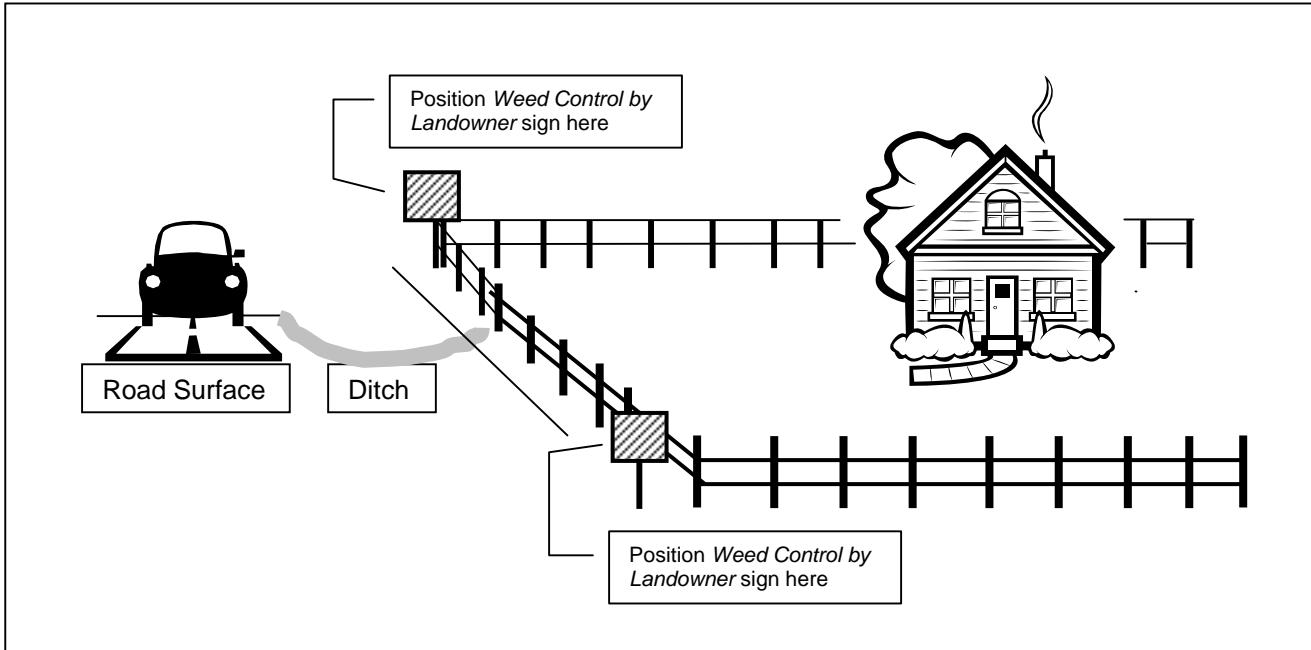
\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Lewis and Clark County Weed District Representative

\_\_\_\_\_  
 Date

<b><u>Office Use Only</u></b>					
Permit Reviews:	<input type="checkbox"/> 1 <sup>st</sup> Year	<input type="checkbox"/> 2 <sup>nd</sup> Year	<input type="checkbox"/> 3 <sup>rd</sup> Year	<input type="checkbox"/> 4 <sup>th</sup> Year	<input type="checkbox"/> 5 <sup>th</sup> Year
Comments/Recommendations: _____					
_____					
_____					
_____					

# WEED CONTROL BY LANDOWNER SIGN PLACEMENT DIAGRAM



# Appendix G

## Fee Schedule



**LEWIS AND CLARK COUNTY  
COMMUNITY DEVELOPMENT AND PLANNING**

**FEE SCHEDULE**

*An initial, non-refundable fee is paid at the time of application*

**SUBDIVISIONS**

Major Subdivision (reviewed as)	
Preliminary Plat Application	\$800 + \$25/unit + \$50/non-residential unit
Final Plat Application	\$400 + \$25/unit + \$50/non-residential unit
First Minor Subdivision (reviewed as)	
Preliminary Plat Application	\$600 + \$25/unit + \$50/non-residential unit
Final Plat Application	\$300 + \$25/unit + \$50/non-residential unit
Subsequent Minor Subdivision (reviewed as)	
Preliminary Plat Application	\$700 + \$25/unit + \$50/non-residential unit
Final Plat Application	\$400 + \$25/unit + \$50/non-residential unit
Subdivision Variance Application	\$150
Preliminary Plat Extension Request	\$200
Modification of Preliminary Approval	\$400
Subdivision Improvements Agreement	No Charge
Subdivision Improvements Agreement Extension Request	\$150
Amended/Corrected Plats	
Preliminary and Final	\$300
Survey Review	\$100 (1 <sup>st</sup> review) \$100 (2 <sup>nd</sup> review)

**ZONING**

Administrative Conditional Use Permit	\$150
After the Fact	2x Normal fee
Conditional Use Permit	\$250

After the Fact	2x Normal fee
Variance Request	\$350
After the Fact	2x Normal fee
Map Amendment	\$500
Text Amendment	\$500
Creation of a Zoning District	\$500
Written Zoning Determination	\$40
 <b><u>MISCELLANEOUS FEES</u></b>	
Pre-Application Conference	No Charge
Agricultural Covenant Revocation Request	\$200 (additional subdivision review fees may also apply)
Road Adjustments (Establishment, Alteration and Abandonment of County Roads)	\$300
Address Assignment (Includes Address Plaque)	\$25
Address Plaque Only	\$10 each
Encroachment Agreement Request	\$150
After the Fact	2x Normal Fee
Approach Permit	\$150 per approach
After the Fact [Amended 11.25.2014]	\$500 plus permit fee
Approach Permits when submitted for an entire subdivision prior to final plat approval	\$50 per approach
Excavation Permit [Adopted 11.25.2014]	\$50 plus surface assessment fee (Public Works Manual S. 5.13)
Publications (regulations, plans, etc.)	\$10/each
Publications are provided on a compact disc in Electronic format (Adobe PDF and/or Microsoft Word)	
Copies	\$0.50 for 1 <sup>st</sup> page and \$0.25 for each subsequent page
Electronic copies on Compact Disc	\$10/each Compact Disc

Appendix H  
Traffic Engineering  
Analysis Outlines





## Traffic Impact Study outline

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The contents of a Traffic Impact Study vary with the size and complexity of the development proposal and are customized on a case-by-case basis to meet the specific needs of the study. The following guidelines describe the elements required (at a minimum) for preparing a Traffic Impact Study and provide for the consistent preparation of these studies throughout the County. The purpose of a Traffic Impact Study is to: ensure that the proposed developments do not adversely affect the transportation network; identify any traffic problems related to the development; to develop solutions to the potential problems; and present improvements to be included in the proposed development. The TIS shall contain, at a minimum, the following information and be provided in the recommended format below:

1. Introduction
2. Existing Conditions
  - 2.1. Existing Transportation System
  - 2.2. Traffic Data Collection
  - 2.3. Existing Performance Analysis
3. Future Conditions
4. Proposed Development
  - 4.1. Trip Generation Characteristics
  - 4.2. Trip Distribution and Assignment
5. Traffic Impacts with Development
6. Recommendations
7. Summary and Conclusions

A brief narrative for recommended content of each chapter of the TIS follows.

### Introduction

This section of the Traffic Impact Study should include the location of the development site and a description of the proposed development. The description should include the existing and proposed uses of the site, size of the proposed development, general terrain features, access to the site, and anticipated completion date of the development (including phasing). This will include the square footage of each use or number of units proposed.

#### Figures to be included in this section include:

- Vicinity Map
- Site Plan

### Existing Conditions

This section of the Traffic Impact Study should include discussion about the existing roadways, traffic data collected for the development, and a level of service analysis and volume/capacity ratio for all intersections and road segments within the study area.

### Existing Transportation System

The Traffic Impact Study should identify existing conditions of the roads and intersections within the traffic impact corridor. This should include the geometric data (number of lanes, intersection configurations, functional classification, etc.), traffic controls, and traffic volumes.

### Traffic Data Collection

In order to determine the existing traffic demands within the study area, average daily traffic (ADT) count data and manual turning movement count data should be collected. ADT count data should be adjusted to account for seasonal use factors to achieve an average annual daily traffic (AADT) value. If possible, speed data and vehicle classification data should be collected as well.

Manual turning movement counts should be collected at the study area intersections during peak hours (7:00 a.m. – 9:00 a.m. and 4:00 p.m. – 6:00 p.m.) on a Tuesday, Wednesday, or Thursday during weeks, which have no holidays. Off-peak time periods may be analyzed based on the proposed development type (school, shopping centers, theaters, etc.). All studies should include at least two peak hour periods unless pre-approved otherwise by the governing body.

### Existing Performance Analysis

Utilizing techniques as described in the current *Highway Capacity Manual (HCM)*, the relative balance between roadway volumes and capacity, along with the level of service, should be assessed for all major intersections and road segments within the study area.

#### Figures to be included in this section include:

- Existing AM peak hour volumes
- Existing PM peak hour volumes
- Existing AADT traffic volumes

### Future Conditions

The future conditions should be analyzed for the year in which the project is expected to be built out. If the project is proposed to occur over multiple phases, each phase should be evaluated on its corresponding build-out year. The surface transportation network (without the proposed development) assumed for the future

planning horizon should reflect any existing facilities plus general traffic growth, any firmly committed transportation improvements, and other planned developments that would affect roadways within the study area.

An analysis of the study area should be conducted using anticipated (future) traffic volumes without the proposed development. Future daily and peak hour traffic volumes should be developed for the study area. The method and assumptions should be documented clearly so calculations are easy to follow and replicated if necessary.

A capacity analysis and level of service analysis should be completed for all peak hours for future conditions at all major intersections and road segments within the study area.

Figures to be included in this section include:

- Development site plan
- Future AM peak hour volumes (without development)
- Future PM peak hour volumes (without development)
- Future AADT traffic volumes (without development)

### Proposed Development

This section discusses the proposed development characteristics and determines the number of additional trips and distribution rates that are expected to occur as a result of the development.

### Trip Generation Characteristics

A trip generation analysis should be performed to determine future traffic volumes attributable to the proposed development in the study area using the latest edition of the *Institute of Transportation Engineers (ITE) Trip Generation Manual* or other industry publications. This analysis establishes the number of trip rates generated by the proposed development. Data limitations (sample sizes,  $R^2$  values, etc.), data age, choice of average rate versus statistical significant modification should be presented and discussed. Methodologies for trip reductions associated with pass-by trips, shared-use trips, and alternative transportation modes should be discussed if applicable.

### Trip Distribution and Assignment

Traffic generated by the proposed development must be distributed and assigned to the roadway network. This distribution will determine the extent of the development's impacts on the surrounding roadways. Trip distribution rates may be

based on traffic forecasts, market analysis, existing traffic flows, applied census data, and professional judgment. The basic method and assumptions used must clearly be stated so that the County can replicate these results.

Figures to be included in this section include:

- Trip distribution percentages on the surrounding network
- Estimated AM peak hour volumes generated by the development
- Estimated PM peak hour volumes generated by the development

Traffic Impacts with Development

This section looks at the potential impact that the development will have on the transportation system. Using the trip generation and distribution rates determined in Section 4.0 and applying those trips to the future network discussed in Section 3.0, the future conditions of the transportation system can be analyzed. An intersection and corridor analysis should be completed to determine the future traffic conditions and to determine if any mitigation measures are necessary.

A capacity analysis and level of service analysis should be completed for all peak hours for future conditions with the site developed as proposed at all major intersections and road segments within the study area.

Any mitigation measures that may be required due to the additional trips from development should be discussed. An analysis of the mitigated transportation system should then be completed to show how the system is expected to perform after the mitigation measures have been put in place.

The key elements of the project impact analysis include:

- A peak hour intersection LOS for each study period. Identify whether the traffic from the proposed project will result in a change in the LOS.
- A volume/capacity analysis for all major road segments within the study area.
- The appropriateness of access locations and the need for future traffic signals.
- Turn lane requirements.
- Sight distances where new access points are recommended.
- Appropriateness of acceleration or deceleration lanes.
- Signal warrant analyses if new traffic signals are recommended.
- Impacts on any special issues that were identified such as safety or community concerns.

Figures to be included in this section include:

- Future AM peak hour volumes (with development)
- Future PM peak hour volumes (with development)
- Future AADT traffic volumes (with development)

### Recommendations

If unsatisfactory levels of service are to occur, then the applicants should provided the County with any proposed improvements, which will mitigate any negative impacts generated by the proposed development. Recommendations for improvements needed to remedy deficiencies in the network caused by the proposed development should be discussed in detail. These recommendations should be provided to help ensure that the proposed development functions with the surrounding area.

### Summary and Conclusions

The conclusion of a Traffic Impact Study should be a clear description of the study findings including a reiteration of any recommendations being made as part of the study. This concluding chapter should serve as an executive summary.



## Professional Engineering Report (PER) outline

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In general, the contents of a Preliminary Engineering Report (PER) vary. The content will be based on the size and complexity of the development proposal, and the number and classification of roads inventoried in the traffic impact corridor. As an example, a PER prepared for a Local Road traversing level terrain with few intersecting roads and lesser traffic volumes, would presumably have less in content and complexity than a PER prepared for a proposed development with an impact corridor containing a Minor Collector situated in rolling terrain. The following guidelines describe the minimum elements required, and the recommended format for preparing a PER. These guidelines will provide for consistent report preparation.

### **Cover Page**

The cover page of the PER should have a header listing the proposed development's name. The report name shall duplicate that shown on the subdivision's Traffic Impact Study (TIS). If the PER is being prepared as a road assessment inventory not associated with a proposed development, then show the inventoried road names. Include the date the report was prepared, the engineering firm's name that prepared the report, and the engineering seal and signature of the engineer responsible for completing the PER.

### **Table of Contents**

Include a Table of Contents that follows the format of this document.

#### **1. Introduction**

Provide a brief narrative of why the report is required, and for what subdivision if applicable. In most cases a brief restatement of the development's TIS Introduction will be sufficient with information added herein for identifying the inventoried road segments.

#### **2. Location**

Provide brief narrative of the proposed subdivision's location and traffic impact corridor relative to landmarks and roadways. Include approximate coordinates (e.g. 46° 36' 58" N, 111° 53' 27" W) and legal description (e.g. NW1/4, NW1/4 of Section 20, T10 N, R2W) of the center point enclosed within the proposed subdivision as a quick means of location and reference (e.g. Google Earth). Example descriptions that may be used to briefly describe the narrative of the geographical impact corridor location include:

- Distance and direction from City/town name;

- Highway route number;
- Mile posts; and
- Crossing routes and intersecting road/street names

Include a Vicinity Map in the appendices showing the approximate boundaries of the development and the affected roads identified in the traffic impact corridor. Recommendation is to use the same map as contained in the TIS to provide consistency between reports. Also include a copy of the development's Preliminary Plat, if applicable, in the appendices.

### **3. Traffic Impact Corridor**

Identify the traffic impact corridor by noting all the roads affected (by name). Most of the information in this section of the PER should be previously identified in the Traffic Impact Study (if applicable) as approved in the preliminary plat process. This should allow for a brief summary under this section of the PER. Identify the date and author of the referenced TIS. Include a copy of the approved TIS in the appendices. Note the approximate length (in feet) of each road segment within the corridor. Length can be derived from field review or measured from digital mapping. Regardless, road measurement techniques should be noted in the report (under Part 4. Field Review Methods) to allow for a reasonable check of accuracy by the reviewer. Note the location of the proposed subdivision's ingress/egress points.

### **4. Field Review Methods**

Provide a brief narrative summarizing the field review methods undertaken to complete the PER. In essence, this section allows Lewis and Clark County to review and approve the methodology and to reproduce the results if later field observations are undertaken. It is highly recommended that the PER author first gain Lewis and Clark County's pre-approval of the proposed field review methodology before undertaking the work. Following is a simplistic example of what the narrative might describe.

*"The field review was intended to be a reconnaissance level assessment of the existing roadway conditions. Firm XYZ personnel walked Example Lane, NorthSouth Drive, and NoName Road. A tape measure, range finder, or distance measuring wheel was used for all distance measurements. A handheld clinometer and a 4-foot long digital smart level were used to measure grades and slopes. The radii of horizontal curves were approximated by tracing the curves on aerial photographs. The measurements taken should be considered approximate due to the low level of accuracy associated with these handheld tools and aerial photographs. All locations between mileposts (MP) were based on measuring wheel readings during the field review. A handheld Global Positioning System (GPS) unit was used to mark the location of each significant observation. All measurements and GPS points given within this report should be viewed as approximate representations of actual conditions."*



## **5. Traffic Data**

From the TIS, recapitulate the traffic impact corridor's ADT for each road segment. Note the current ADT and the future ADT based on the growth rate. Lastly, note the ADT with post-development full build out traffic added to the transportation system. This information will be applied to the following sections of the report.

## **6. Roadway Typical Section Standards**

For each road or road segment within the traffic impact corridor as described in the *Traffic Impact Corridor* section, note which Lewis and Clark County road typical section is applicable based on the ADT at the development's full build out year. The current and future post-development ADT should be attainable from the approved TIS.

## **7. Accident Data**

Summarize accident data and crash history for the roads within the traffic impact corridor if statistics are available. Statistics should be based on a minimum 5-year period, with a 10-year period recommended. Coordinate with the Montana Department of Transportation and Lewis and Clark County as applicable to obtain:

- Number of crashes per road segment;
- Types of crashes; and
- A listing of locations with an unexpectedly high number of crashes and a brief description of why a higher than normal number of crashes may be occurring and proposed countermeasures

Include photos with captions of locations in the report appendices to help visualize the potential issues that need to be addressed. Reference crash locations to known features such as intersections or mileposts.

## **8. Design Standards**

### **8.1 Major Design Features**

The previous sections of the report provided background information. This section provides an assessment of the road's condition and work required to bring the road into standards. Standard criteria to assess the conditions are contained in Appendix J: Lewis and Clark Road Standards, and its reference standards. Each applicable section below shall have materials quantified in terms of lengths, volumes, areas, etc. to serve as the basis for presenting the *Cost Estimate* contained later in the PER. The narrative shall provide a description of how each material cost was estimated. Spreadsheet calculations are highly recommended to aid in review and approval of the PER. Include copies of the spreadsheets in the report appendices.

### **8.1.1 General Terrain & Design Speed**

Describe the terrain that each affected road traverses, e.g. level, rolling or mountainous. Note the design speed of the roadway in accordance to the design criteria. A determination of terrain and design speed has a direct affect on certain design standards.

### **8.1.2 Road Width and Number of Lanes**

Document the lane width and shoulder width of each road segment contained in the traffic impact corridor. Recapitulate each to standards based on the narrative provided in the *“Roadway Typical Section Standards”*. Intersections and other auxiliary lanes should be described in the section below entitled *“Intersections”*.

### **8.1.3 Surfacing Types and Thickness**

Identify the existing surfacing type and thickness based on records for each road in the traffic impact corridor. Note the number and thickness of pavement overlay(s). Each changing condition should be described. Developing reasonably accurate information may require coordination with the Montana Department of Transportation (if applicable), and the Lewis and Clark County Road Department to obtain available records, or to make a determination based on historical knowledge and department interviews. Due to the cost prohibitive nature, geotechnical drilling and soil sampling to ascertain the surfacing section makeup is not required for the PER. However, all efforts should be made to review and research available past geotechnical evaluations.

Provide a brief description of the general structural deficiencies based on a visual assessment including rutting, alligator cracking, bleeding, cross slope deficiencies, etc. Although ultimately the PER is a tool in estimating each road segment’s reconstruction cost based on County standards, under certain circumstances information may present a case that the surfacing section is adequate to meet the needs for the future traffic loading demands. Or, based on the findings, the author may also present methodology to rehabilitate the roadway by alternative methods (e.g. full-depth recycle with cement treated base.)

#### **8.1.4 Bridges**

Note the bridge location(s) within the road segment referencing stream or channel name. In addition, describe its location relative to another landmark such as a distance from the nearest milepost, intersection, etc. Arrange a meeting with the Lewis and Clark County Road Department to obtain information on recent bridge repairs, hydraulic conveyance issues, etc. Note the bridge length, overall deck width, barrier rail construction, traveled way width, abutment type, whether it is clear span or number of piers, decking and beam materials, general condition, etc. Review the structure pursuant to current floodplain regulations.

#### **8.1.5 Horizontal Alignment**

Identify all of the major horizontal features for each road segment, including features that may not meet the proposed design criteria. Describe alignment deflections (angled breaks) without horizontal curves that do not meet criteria. Note horizontal curve deflections, radius, etc. to ascertain if reconstruction to meet standards is necessary. Reference these geometric features by milepost or by some other measurable means from an identifiable physical feature (e.g. the horizontal curve begins approximately 400 feet north of (intersection name)). Information provided in this section could be particularly important in accurately estimating such item costs as earthwork, utility relocation, and new right-of-way. Discuss the feasibility of improving substandard horizontal curves.

#### **8.1.6 Vertical Alignment**

Provide a general description for all the major vertical alignment features. The discussion should identify grades that exceed design criteria, sight distance, and the vertical alignment improvements that can be reasonably obtained. An estimate of the improvement needs to be incorporated in the final cost estimate. As an example, if a section of road requires flattening the grade and lengthening a crest vertical curve to obtain adequate sight distance, then an additional amount of earthwork excavation should be assumed, also potentially resulting in wider cut slopes, utility relocations, right-of-way, etc.

#### **8.1.7 Cut / Fill Slopes**

Describe the cut and fill slope standards associated with each road segment. Include in the narrative a discussion on clear zone and barrier warrants.

Compare standards to the actual field conditions. Note the general slope rates, fill heights, cut depths, guardrail locations (or lack thereof), and ditch depth/offsets. The information in this section should be used to help estimate other impacts associated with slope flattening and changing ditch offsets including the need for lengthened culverts, additional right-of-way, and utility impacts as an example. Address the estimated work needed to lay back cut slopes identified as being a sight obstruction around the inside of horizontal curves.

#### **8.1.8 *Sight Distance***

In this section, elaborate on each sight obstruction either identified under Parts 8.1.5 through 8.1.7 or other roadside items such as utilities, vegetation, buildings, etc. Pay special attention to intersections and approaches that may not be warranted for reconstruction due to traffic impacts, but otherwise contain intersection sight obstructions. Make a determination whether the intended road reconstruction will mitigate the observed safety issues.

#### **8.1.9 *Driveways and Misc. Access Points***

Discuss all private access points, with the exception of public approach intersections, which will be described under the section entitled *Intersections* later in this report. From field observations record the number of accesses, widths, locations relevant to other access points, issues on safety, potential means of combining, etc. Each access point will have an associated cost in replacing approach culverts and the approach in general if the road segment to be reconstructed requires substantial widening or horizontal or vertical adjustments.

#### **8.1.10 *Drainage***

Arrange a meeting with the Lewis and Clark County Road Department to determine if there are specific drainage issues that need to be addressed, and to document recommendations. Include storm drain or irrigation adjustments in the narrative and cost estimate. Determine costs associated with either replacing or lengthening each culvert based on the existing size and condition, and provide estimated costs to replace undersized culverts based on the knowledge obtained from the Road Department. During field reviews, notable issues should be recorded that can otherwise be used to prepare the overall PER cost estimate. Such items might include the need for riprap, realignment of a culvert to fit the drainage channel, pipe corrosion (i.e. wrong pipe material), etc.

### **8.1.11 Intersections**

The proposed development's approved TIS should identify intersection deficiencies in terms of affects to the transportation system. Provide a narrative in this section more fully describing the geometric revisions (e.g. addition of a turn lane), or other changes required to the permanent traffic control (e.g. installation of a new signal) as initially addressed in the TIS. Provide an adequate description of intersection reconstruction needs to develop the overall PER cost estimate. Example discussion includes the length, width of new right or left turn lanes and the affects to utilities and right-of-way.

### **8.1.12 Right-of-Way**

Provide an estimate of the additional acreage required to meet standards, and additional acreage needed for site-specific improvements such as flattening cut or fill slopes for safety purposes, or reconstructing substandard horizontal or vertical curves. Discuss how the assumed cost per acre has been estimated. Depending on the length of road or road segments to be reconstructed, a complete right-of-way record research will likely be cost-prohibitive. Instead, if easement fencing is in place, choose a few representative sample locations, and obtain representative field measurements and offsets to record the assumed right-of-way width. While completing field reviews, if property pins along the top of cut or base of fill are observed, taking approximate centerline measurements in sample locations will also suffice for estimating the existing roadway easement width in those locations where there is no roadside fencing.

### **8.1.13 Utilities**

Identify probable utility impacts from field observation noting telephone pedestals, power poles, utility markers, fire hydrants and all other "in the field indications". In addition, contact local utility providers to assess whether their facilities are within the traffic impact corridor. Discuss the methodology used to document the estimated cost to relocate utilities. Depending on the segment or road lengths, representative small sample locations can be chosen based on field review, and these sample sections can be verified with an all-call utility locate.

### **8.1.14 Miscellaneous Features**

Discuss and quantify any other miscellaneous features that do not fall in the above categories that could add appreciable cost to the road reconstruction. Example items may include the need for guardrail, new sidewalk, retaining walls, and detours during construction around major drainage features.

## **9. Cost Estimate**

Estimate the preliminary reconstruction cost for each road or road segments and their appurtenances based on the items and narratives provided in Part 8. The cost estimate shall be based on the future conditions at the time of the development's full build-out. The estimate shall include any other features unique to the facility that present a significant cost due to reconstruction or relocation. Following is the recommended format. Provide the estimate spreadsheet in the appendices. The quantity calculations in Part 8 to be applied herein shall provide a clear and concise methodology on the estimating procedure to allow for reviewer approval. Lump sum costs are discouraged.

### **A. Construction Estimate**

#### **1. Earthwork (Excavation – Cubic Yards)**

- 1.1 Roadway (average end area methodology)
- 1.2 Corrective Measures for Horiz. Curves
- 1.3 Corrective Measures for Vertical Curves
- 1.4 Turn Lanes/Intersections/Misc. Spot Widening
- 1.5 Other Slope Modifications
- 1.6 Approach Reconstructions
- 1.7 Clearing and Grubbing (Acre)
- 1.8 Miscellaneous Other

#### **2. Roadway Surfacing**

- 2.1 Sub-base Course (cubic yards)
- 2.2 Select Base Course (cubic yards)
- 2.3 Crushed Top Surfacing (cubic yards)
- 2.4 Hot Plant Mix Asphalt Surfacing Incl. Binder (tons or square yards)
- 2.5 Subgrade Geotextile Stabilization (square yards)
- 2.6 Asphalt Seal Coat Incl. Aggregate (tons or square yards)

#### **3. Bridge**

- 3.1 Decking Rehabilitation (square foot)
- 3.2 Beams (linear foot)
- 3.3 Abutments (cubic yards)
- 3.4 Structure Excavation (cubic yards)
- 3.5 Select Structure Backfill (cubic yards)
- 3.6 Barrier Rail (linear foot)

#### **4. Drainage**

- 4.1 Cross-Drain Road Culverts (linear feet for each size and type)
- 4.2 Road Approach Culverts (linear feet for total number approaches)

- 4.3 New Storm Drain Pipe (linear feet)
- 4.4 Irrigation Pipe (linear feet)
- 4.5 Irrigation Channel Change (cubic yards)
- 4.6 Trench Excavation (cubic yards)
- 4.7 New Manholes (each)
- 4.8 New Drop Inlets (each)
- 4.9 Pipe Bedding (cubic yards)
- 4.10 Riprap (cubic yards)
- 4.11 Concrete Curb & Gutter (linear feet)
- 5. Remove and Adjust Misc. (As Applicable)**
  - 5.1 Remove Pavement (square yards)
  - 5.2 Remove Sidewalk (square yards)
  - 5.3 Remove Curb & Gutter (linear feet)
  - 5.4 Remove Fencing (linear feet)
  - 5.5 Remove Guardrail (linear feet)
  - 5.6 Adjust Manholes (Each)
  - 5.7 Adjust Valve Boxes (Each)
  - 5.8 Relocate Mailboxes (Each)
  - 5.9 Adjust Water Line (linear feet)
- 6. Erosion Control**
  - 6.1 Condition Seedbed Surface (Acre)
  - 6.2 Permanent Seeding (Acre)
  - 6.3 Fertilizer (Acre)
  - 6.4 Temporary Erosion Control, e.g. silt fence (linear feet)
- 7. Utility Relocations (by Type)**
  - 7.1 TV
  - 7.2 Gas
  - 7.3 Fiber Optic
  - 7.4 Telephone
  - 7.5 Power
- 8. Fencing**
  - 8.1 Farm Field (linear feet Steel or Wood Posts)
  - 8.2 Single Fence Panel (Each)
  - 8.3 Double Fence Panel (Each)
  - 8.4 Gate (linear feet by Type: Steel or Drop Wire)
- 9. Right-of-Way**
  - 9.1 Cost per Acre
  - 9.2 Landscape Replacement
- 10. Permanent Traffic Control**
  - 10.1 Traffic Signal (Each)
  - 10.2 Signs (Each)
  - 10.3 Striping (linear feet)
  - 10.4 Highway/Intersection Lighting
- 11. Miscellaneous Other**

- 11.1 New Guardrail (linear feet)
- 11.2 New Sidewalk (square yards)
- 11.3 Retaining Walls (square yards)
- 11.4 Detours
- 11.5 Other

- B.** Subtotal **Costs** (Item A. Construction Estimate Excluding Item 7, Utility Relocations and Item 9, Right-of-Way)
- C.** Estimated **Traffic Control** During Construction (10% of Item B)
- D.** **Subtotal B. + C.**
- E.** Estimated **Construction Mobilization** (8% of Subtotal D.)
- F.** **Subtotal D. + E.**
- G.** **Construction Contingency** (15% of Subtotal F.)
- H.** **Subtotal F. + G.**
- I.** **Inflation** (3% per year of Construction Subtotal H. See Equation Below.)
- J.** Estimated **Total Construction Cost (H. + I.)**
- K.** Estimated **Engineering Design** (15%-25% of Item J.)
- L.** Estimated **Construction Engineering Administration** (5%-10% of Item J.)
- M.** **Total Cost to Reconstruct** (Sum Items J.+K.+L.+ Right of Way & Utility Relocates)

Adjust the estimate for an annual inflation. For Item I., Inflation, the formula is:

$$\text{Future Cost (i.e. Item J.)} = (\text{Present Cost, i.e. Item H.}) \times (1+i)^n$$

Where:  $i$  = Inflation factor. Use 3% unless requested otherwise by the County ( $i = 0.03$ )

$n$  = the number of years from the time the estimate is prepared to the construction of the road, estimated as the development full build-out year)

**Example:**

B.	Subtotal of Construction = (Excluding right-of-way and utility relocations)	\$400,000
C.	Traffic Control (10%) =	<u>\$40,000</u>
D.	Subtotal =	\$440,000
E.	Construction Mobilization (8%) =	<u>\$35,200</u>
F.	Subtotal =	\$475,200
G.	Construction Contingency (15%) =	<u>\$71,280</u>
H.	Subtotal =	\$546,480
I.	Inflation (@3% for 5 years) =	<u>\$87,040</u>
J.	Total Construction =	\$633,520
K.	Engineering Design (20%)	\$126,700
L.	Construction Administration (5%)	<u>\$31,700</u>
M.	Subtotal =	\$791,920
	Right-of-Way Acquisition =	\$100,000



Utility Relocations =	<u>\$75,000</u>
<b>Grand Total Cost</b> (Rounded to \$1k) =	<b>\$967,000</b>

## 10. Summary and Conclusions

The concluding section of the PER should serve as an executive summary with a clear description of the study findings and estimated cost.

