Huffine Lane
Access Management Plan

Bozeman & Gallatin County, Montana

Montana Department of Transportation

STPP 50-2(46)82

August, 2007

Huffine Lane Access Management Plan

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SECTION 1
INTRODUCTION

Purpose and Need

The "Huffine Lane Access Management Plan" represents the long range vision for managing access to Huffine Lane (US 191/P-50) between Four Corners (Jackrabbit Lane) and College Street in Bozeman, MT. This vision is shared by the stakeholder agencies with an interest in Huffine Lane: the Montana Department of Transportation; the Federal Highway Administration; the City of Bozeman; and Gallatin County. Representatives from these agencies concur that:

- For the safety and welfare of the traveling public, Huffine Lane should be managed so that safety is the highest priority; and that
- To protect prior public expenditures of funds invested previously in Huffine Lane, Huffine Lane should be managed so that ease of east/west mobility by the traveling pubic through the corridor remains high long into the future.

To this end, the "Huffine Lane Access Management Plan" has been implemented.

The Purpose of the "Huffine Lane Access Management Plan" is to balance the competing needs for safety within the corridor, mobility through the corridor, and access to the corridor in the following priority order:

1. Safety
2. Mobility
3. Access

The Need for this plan results from Huffine Lane's (US 191 / P-50) context and use within the larger regional transportation network. This corridor serves as the primary gateway between the City and Yellowstone National Park further to the southwest, as well as providing local access between the Four Corners area and downtown Bozeman. Huffine Lane is a non-rural highway that provides access to a developing suburban area west of Bozeman, as well as serving as a regional highway providing access to Yellowstone Park and other destinations. As such, it is imperative that this highway maintain its capacity to move large volumes of traffic safely and efficiently. As a result, direct access to parcels of land abutting Huffine Lane is subordinate to providing service to through traffic in a safe and efficient manner.

Bozeman, MT and Gallatin County, MT are high growth areas within the state. Development along the corridor has increased, and is expected to in the future. Without a plan to actively manage access to Huffine Lane in light of these continuing growth pressures, there is a high likelihood that the safety and mobility within the corridor will decrease, possibly to unsafe or unacceptable levels.

It is the responsibility of the Montana Department of Transportation to manage Huffine Lane in a manner that preserves both the safety and the functional integrity of the highway. This segment of Huffine Lane has been designated a Controlled Access Highway. The "Huffine Lane Access Management Plan" further defines the specifics of access control on this facility, in an attempt to foster safe and efficient movement of persons and goods using the highway into the foreseeable future.

Principles of Good Access Management

Access management programs seek to limit and consolidate access along major roadways, while promoting a supporting street system and unified access and circulation systems for development. The result is a roadway that functions safely and efficiently for its useful life, and often results in a more attractive corridor. Principles of good access management can be found on the Transportation Research Board Access Management website (www.accessmanagement.gov/principlestxt.html). Good access management plans are accomplished by applying the following principles:

1. **Provide a Specialized Roadway System:** Different types of roadways serve different functions. It is important to design and manage roadways according to the primary functions that they are expected to serve.
2. **Limit Direct Access to Major Roadways:** Roadways that serve higher volumes of regional through traffic need more access control to preserve their traffic function. Frequent and direct property access is more compatible with the function of local and collector roadways.
3. **Promote Intersection Hierarchy:** An efficient transportation network provides appropriate transitions from one classification of roadway to another. For example, freeways connect to arterials through an interchange that is designed for the transition. Extending this concept to other roadways results in a series of intersection types that range from the junction of two major arterial roadways, to a residential driveway connecting to a local street.
4. **Locate Signals to Favor Through Movements:** Long, uniform spacing of intersections and signals on major roadways enhances the ability to coordinate signals and to ensure continuous movement of traffic at the desired speed. Failure to carefully locate access connections or median openings that later become signalized, can cause substantial increases in arterial travel times. In addition, poor signal placement may lead to delays that cannot be overcome by computerized signal timing systems.
5. **Preserve the Functional Area of Intersections and Interchanges:** The functional area of an intersection or interchange is the area that is critical to its safe and efficient operation. This is the area where motorists are responding to the intersection or interchange, decelerating, and maneuvering into the appropriate lane to stop or complete a turn. Access connections too close to intersections or interchange ramps can cause serious traffic conflicts that result in crashes and congestion. (The term “corner clearance” refers to the distance from an access to the adjacent intersection. Adequate corner clearance standards help prevent congestion, promote efficiency through an intersection, and minimize the frequency of crashes.)
6. **Limit the Number of Conflict Points:** Drivers make more mistakes and are more likely to have collisions when they are presented with the complex driving situations created by numerous conflict points. Conversely, simplifying the driving task contributes to improved traffic operations and fewer collisions. A less complex driving environment is accomplished by

limiting the number and type of conflicts between vehicles, vehicles and pedestrians, and vehicles and bicyclists.

7. **Separate Conflict Areas:** Drivers need sufficient time to address one set of potential conflicts before facing another. The necessary spacing between conflict areas increases as travel speed increases, to provide drivers adequate perception and reaction time. Separating conflict areas helps to simplify the driving task and contributes to improved traffic operations and safety.
8. **Remove Turning Vehicles from Through Traffic Lanes:** Turning lanes allow drivers to decelerate gradually out of the through lane and wait in a protected area for an opportunity to complete a turn. This reduces the severity and duration of conflict between turning vehicles and through traffic and improves the safety and efficiency of roadway intersections.
9. **Use Non-traversable Medians to Manage Left-Turn Movements:** Medians channel turning movements on major roadways to controlled locations. Research has shown that the majority of access-related crashes involve left turns. Therefore, non-traversable medians and other techniques that minimize left turns or reduce the driver workload can be especially effective in improving roadway safety.
10. **Provide a Supporting Street and Circulation System:** Well-planned communities provide a supporting network of local and collector streets to accommodate development, as well as unified property access and circulation systems. Interconnected street and circulation systems support alternative modes of transportation and provide alternative routes for bicyclists, pedestrians, and drivers. Alternatively, commercial strip development with separate driveways for each business forces even short trips onto arterial roadways, thereby reducing safety and impeding mobility.

In order to promote the highest level of access and circulation to and from properties abutting Huffine Lane after all elements of the plan have been implemented, it is important that a supplemental system of north-south intersecting streets and east-west streets parallel to Huffine Lane be developed. Section 5 of this plan indicates a rough framework for a future street network north and south of Huffine Lane which, if implemented, will complement the access control strategies being contemplated for Huffine Lane. It is suggested that the details of this future street network be developed and integrated into the Greater Bozeman Area Transportation Plan.

Multi-Modal Considerations

Bicycle and Pedestrian Facilities Considered

The stakeholder agencies involved in this study recognize the need for Huffine Lane to accommodate bicyclists and pedestrians as well as powered vehicles.

Huffine Lane currently has an eight foot paved shoulder on each side of the roadway, which bicyclists can use. This eight foot shoulder width is maintained in the future configuration of Huffine Lane. Thus, the paved shoulder will

provide a continuous east-west bike facility along Huffine Lane upon full implementation of the plan.

The right-of-way width planned for Huffine Lane under this plan is sufficient to provide for sidewalks on both sides of the roadway. However, specific pedestrian facilities are determined as a site development detail during the site plan review and development approval process. Sidewalks will be constructed as properties adjacent to Huffine Lane develop or redevelop, and development regulations allow them to be required.

Bus Transit Considerations

The Streamline bus, which circulates between Belgrade and the City of Bozeman, travels Huffine Lane as part of its route. There are currently stops at several of the trailer parks and the Gallatin Valley Mall with the area of this Access Management Plan. Currently, all stops happen off the right-of-way of Huffine Lane. With the eight foot paved shoulders on Huffine, and adequate right-of-way in both the existing and future proposed conditions, there is ample room to develop future bus stops on Huffine Lane if desired. Nothing contemplated in this Access Management Plan precludes that possibility.

SECTION 2
ACCESS APPLICATION INFORMATION

The currently approved accesses to Huffine Lane are shown in Section 3 - "Huffine Lane Access Management Plan Details" included in this document. These accesses have been approved for the current land uses only, and for the current intensity of land use only.

Any change in land use from an existing approved land use, intensification of a current land use, or request for a new or revised access to Huffine Lane requires a property owner to make application to the Montana Department of Transportation via a "Driveway Approach Application and Permit." A copy of the application is included herein, for information purposes. However, the applicant should check with the Department for the latest edition of the permit application and instructions prior to beginning the application process.

An application for a "Driveway Approach Application and Permit" for Huffine Lane should be made to Bozeman Maintenance Office at 907 North Rouse Street in Bozeman. The phone number is: 406.556.4700. Or, the application can be made via the Butte District Office of the Montana Department of Transportation, at 3751 Wynne, PO Box 3068, Butte, MT 59702-3068. The phone numbers are: 406.494.9600 or 800.261.6909. The FAX number is: 406.494.4396.

MDT staff will review the permit application, and indicate to the applicant the appropriate "next steps" the applicant must undertake.

Huffine Lane between Four Corners (Jackrabbit Lane) and College Avenue in Bozeman, MT is designated a "Controlled Access Highway." As such, land owners requesting a new access to, or modifications of an existing access, to Huffine Lane are required to submit such requests through the "System Impact Action Process" (SIAP). The SIAP is a coordinated review of projects initiated outside of the Montana Department of Transportation that may significantly or permanently impact the state highway for which the access request is made. The Butte District staff will direct the applicant appropriately for review under the SIAP.

A copy of the "Guide to the System Impact Process" for the Montana Department of Transportation is included herein, for information purposes. However, the applicant should check with the Department for the latest edition of the "Guide to the System Impact Process" and instructions prior to beginning the application process.

Irrespective of whether modifications to existing land uses or modifications to existing accesses are being contemplated - permission to perform any and all work within the Montana Department of Transportation right-of-way for Huffine Lane must be secured from the Montana Department of Transportation Maintenance Chief PRIOR to the commencement of any such work. The Maintenance Chief is located in the Bozeman Maintenance Office at 907 North Rouse in Bozeman, and can be contacted at 406.556.4700.

STATE OF MONTANA – DEPARTMENT OF TRANSPORTATION
HELENA, MONTANA 59620-1001
DRIVEWAY APPROACH APPLICATION AND PERMIT

– To be filled in by Department of Transportation Personnel –

F.A. ROUTE NO.: _____ **APPROACH STATION:** _____

DISTRICT: _____ **NO.:** _____ **MILEPOST:** _____

COUNTY: _____ **PROJECT:** _____

DRAINAGE AS DETERMINED BY DEPT. OF TRANSPORTATION:

Type: _____ **Size:** _____ **Length:** _____

Access Control: ☐ **Yes** ☐ **No**

_____ _____ _____ _____

Approach Recommended by District Traffic Engineer or Traffic Unit — **Date** — **Approach Application Approved by District Administrator** — **Date**

_____ _____

If Access Control is Yes: Approach Recommended by Access Manager, R/W Bureau — **Date**

APPLICANT (Property Owner)

Name: _____ Phone: _____

Address: _____

herein termed the applicant, requests permission to construct approach(es) described and shown on attached plot plan or plan and profile and hereby made a part of this application.

Please indicate if permits or approaches are required from units of government other than the Department of Transportation. Write the number of permits required in the box:

☐ Federal Government ☐ State ☐ County ☐ City ☐ N/A

Private: _____ Public: _____

Use of Property or Facility: _____
(Residence, Trailer Court, Gas Station, Field Access, Type of Business, etc.)

LOCATION:

City or Town: _____
(If rural, direction & approx. distance from nearest city or town)

Street Name, if any: _____

ROADWAY OR HIGHWAY:

Sight Distance: Left: _____ Right: _____
Surfacing: _____ Width: _____

APPROACH:

Estimated number of trips per day: _____
Width: _____ Flare: _____ Side of Roadway: _____
(N, E, S, W)

DRAINAGE: See above as determined by Department of Transportation.

INSTRUCTION CONCERNING USE OF THIS FORM

Applicant will complete and deliver this form in duplicate to the District Administrator serving the area in which the Approach Permit is requested.
The District Administrator, in conjunction with the District Traffic Engineer, is delegated authority to approve curb cuts, public and private approaches serving businesses, residences and agricultural uses in rural or urban areas without further consultation if the traffic conditions are not congested. In congested areas, usually urban situations,

the District Administrator and District Traffic Engineer can request the Manager, Traffic Unit in Helena for additional technical assistance. If this is necessary, the approach should be scaled onto existing plan and profile sheets showing the highway right-of-way and sent to Helena.

- APPROACH PERMIT -

Subject to the following terms and conditions, the permit applied for upon the reverse side hereof, is hereby granted:

1) TERM. This permit shall be in full force and effect from the date hereof until revoked as herein provided.

2) RENTAL. Rental shall be

3) REVOCATION. This permit may be revoked by State upon giving thirty (30) days notice to Permittee by ordinary mail, directed to the address shown in the application hereto attached, but the State reserves the right to revoke this permit without giving said notice in the event Permittee breaks any of the conditions or terms set forth herein.

4) COMMENCEMENT OF WORK. No work shall be commenced until Permittee notifies the District Administrator, shown in application, when he proposes to commence work.

5) CHANGES IN HIGHWAY. If the State changes the highway, or there are other changes to adjoining streets, alleys, etc., which necessitate alterations in structures or installations installed under this permit, Permittee shall make the necessary alterations at Permittee's sole expense or in accordance with a separate agreement.

6) STATE SAVED HARMLESS FROM CLAIMS. In accepting this permit the Permittee, its/his successors or assigns, agree to protect the State 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 installations, maintenance and operation, or by the improper occupancy of said highway right of way, and in case any suit or action is brought against the State and arising out of, or by reason of, any of the above causes, the Permittee, its/his successors or assigns, will upon notice to it/him of the commencement of such action, defend the same at its/his sole cost and expense and satisfy any judgment which may be rendered against the State in any such suit or action.

7) PROTECTION OF TRAFFIC. Insofar as the interests of the State and the travelling public are concerned, all work performed under this permit shall be done under the supervision of the District Administrator of the Department of Transportation and his authorized representatives, and he/they shall indicate barriers to be erected, the lighting thereof at night, placing of flagmen and watchmen, manner in which traffic is to be handled, and shall specify to Permittee how road surface is to be replaced if it is disturbed during operations, but said supervision shall in no way operate to relieve or discharge Permittee from any of the obligations assumed by acceptance of this permit, and especially those set forth under Section 6 thereof.

8) HIGHWAY DRAINAGE. If the work done under this permit interferes in any way with the drainage of the State Highway affected, Permittee shall, at its/his own expense, make such provisions as the State may direct to take care of said drainage.

9) RUBBISH AND DEBRIS. Upon completion of work contemplated under this permit, all rubbish and debris shall be immediately removed and the roadway and the roadside left in a neat and presentable condition satisfactory to the State.

10) WORK TO BE SUPERVISED BY STATE. All work contemplated under this permit shall be done under the supervision of and to the satisfaction of the authorized representative of the State, and the State hereby reserves the right to order the change of location or removal of any structure or installation authorized by this permit at any time, said changes or removal to be made at the sole expense of the permittee.

11) STATE'S RIGHT NOT TO BE INTERFERED WITH. All such changes, reconstructing or relocation shall be done by Permittee, in such a manner as will cause the least interference with any of the State's work, and the State shall in no wise be liable for any damage to the Permittee by reason of any such work by the State, its agents, contractors or representatives, or by the exercise of any rights by the State upon the highways by the installations or structures placed under this permit.

12) REMOVAL OF INSTALLATIONS OR STRUCTURES. Unless waived by the State, upon termination of this permit, the Permittee shall remove the installations or structures contemplated by this permit and restore the premises to the condition existing at the time of entering upon the same under this permit, reasonable and ordinary wear and tear and damage by the elements, or by circumstances over which the Permittee has no control, excepted.

13) MAINTENANCE AT EXPENSE OF PERMITTEE. Permittee shall maintain, at its/his sole expense the installations and structures for which this permit is granted, in a condition satisfactory to the State

14) STATE NOT LIABLE FOR DAMAGE TO INSTALLATIONS. In accepting this permit the Permittee agrees that any damage or injury done to said installations or structures by a contractor working for the State, or by any State employee engaged in construction, alteration, repair, maintenance or improvement of the State Highway, shall be at the sole expense of the Permittee.

15) STATE TO BE REIMBURSED FOR REPAIRING ROADWAY. Upon being billed therefor Permittee agrees to promptly reimburse State for any expense incurred in repairing surface or roadway due to settlement at installation, or for any other damage to roadway as a result of the work performed under this permit.

16) OTHER CONDITIONS AND/OR REMARKS.
   a. All approach side slopes will be constructed on not less than 6 to 1 slope, unless otherwise approved.
   b. No private signs or devices etc., will be constructed or installed within the highway right-of-way limits.
   c. This permit is valid only if approach construction is completed within _____ months from date of issue.

Dated at _____, Montana, this _____ day of _____, 20_____.

The undersigned, the "Permittee" mentioned in the aforegoing instrument, hereby accepts this permit, together with all of the terms and conditions set forth therein.

_____
Permittee

DEPARTMENT OF TRANSPORTATION

Completed Approach Inspected by:

_____
Date

_____
Title

- One copy of permit to District Administrator for file
- One copy of permit to Applicant
- If Access Control is Yes, one copy of permit to Access Manager, R/W Bureau

CN / UPN Project Id	Name/ Location Description	Route/Corr. Fed. Funds Involved? Yes ☐ No ☐
	(For MDT Use Only)	

ENVIRONMENTAL CHECKLIST FOR: ☐ Approach Permit ☐ Encroachment/Occupancy (incl. Utility) ☐ Maintenance Projects (w/ No Right-Of-Way Acquisition, Sale or Transfer)

Location: Highway or Route No _____ Milepost(s) _____

Physical Address: _____ City: _____

Legal Description: County: _____ Township: _____ Range: _____ Section(s):

Applicant Information: Name: _____ Phone:

Company/Utility _____ Business Phone: _____

Mailing Address: Street or Box: _____ City _____ State _____ Zip Code _____

Impact Questions Based on ARM 18.2.261 & 23 CFR 771.117 – Actions that qualify for Categorical Exclusion under MEPA or NEPA	Yes	No	Comment or Explanation (Use attachments if necessary)
1. Will the proposed action impact any historical sites?	☐	☐	
2. Will the proposed action impact any publicly owned parklands, recreation areas, wildlife or waterfowl refuges?	☐	☐	
3. Will the proposed action impact prime farmlands?	☐	☐	
4. a. Will the proposed action have an impact on the human environment that may result from relocations of persons or businesses, changes in traffic patterns, changes in grade, or other types of changes?	☐	☐	
b. Has the proposed action received any preliminary or final approval from the local land use authority?	☐	☐	
5. For the proposed action, is there documented controversy on environmental grounds? (i.e. – has the applicant received a letter of petition from an environmental organization?)	☐	☐	
6. Will the proposed action require work in, across or adjacent to listed or proposed Wild or Scenic River? (See listing on page 2)	☐	☐	
7. Will the proposed action impact air quality or increase noise?	☐	☐	
8. Will the proposed project involve hazardous waste sites? (Superfund, spills, underground storage tanks, old mines etc.)	☐	☐	
9. Will the proposed action affect water quality, wetlands, streams or other water bodies? If the answer is YES, an environment-related permit or authorization may be required (See Attached "Stream Permitting Guidelines").	☐	☐	
10. a. Are there any listed or proposed threatened or endangered species, or critical habitat in the vicinity of the proposed action?	☐	☐	
b. Will the proposed action adversely affect listed or proposed threatened or endangered species, or adversely modify critical habitat?	☐	☐	
11. Will the proposed action require an environment-related permit or authorization? If the answer is "yes," please list the specific permits or authorizations.	☐	☐	
12. Is the proposed action on or within approximately 1 mile of an Indian Reservation?	☐	☐	
a. If Yes – Will a Tribal Water Permit be required	☐	☐	
13. Is the proposed action in a "Class I Air Shed" (Some Indian Reservations)?	☐	☐	
14. Will the proposed action result in increased traffic volumes, increased wait or delays on state highways, or have adverse impacts on other forms of transportation (rail, transit or air movements)?	☐	☐	
15. Is the proposed action part of a project that may require other governmental permits, licenses or easements? If "Yes" than describe the full extent of the project and any other permits, licenses or easements that may be necessary for the applicant to acquire.	☐	☐	

16. ☐ Attach representative photos of the sites where the proposed action would be implemented.

17. ☐ Attach map(s) showing the location(s) of the proposed action(s), Township, Range, Section, highway or route number and approximate milepost(s).

18. Describe Magnitude / Importance of potential impacts: (To be completed by Applicant)(Use Attached Sheets)

Checklist prepared by: _____

Applicant Title Date

Reviewed for completeness by:

MDT District Representative	Title	Date

Approved by:

Environmental Services (When any of the items 1 through 13 are checked "Yes")	Title	Date

Transportation Planning (When items 14 or 15 are checked "Yes")	Title	Date

Checklist Conditions & Required Approvals

A. Applicant is NOT authorized to proceed with the proposed work until ALL of the Checklist Conditions have been met and the required approvals have been obtained.

B. Completes the checklist indicating a "Yes" or "No" for each item,.

C. When a "Yes" is indicated on any of the items except 12 or 13, the Applicant must explain the impacts, and for items 1 through 10 describe any appropriate mitigation measures that will be taken. Use attachments if necessary. If the applicant checks "No" and the District feels there may be potential impacts, the Environmental Checklist must be forwarded to Environmental Services.

D. If a "Yes" is checked in item 10 a. (threatened or endangered species), please provide information naming the particular species and the expected location, distribution and habitat use in the proposed action area, i.e. within the immediate area of the proposed action and possible direct affects to the species; or, in the general area on occasion (seasonally passes through) but does not nest, den or occupy the area for more than a few days – adverse affects are very unlikely.

E. If the applicant checks "Yes" for any item, the approach permit, occupancy agreement or permit along with the checklist and Applicant's mitigation proposal, documentation, evaluation and/or permits must be submitted to MDT Environmental Services for review and approval.

F. When the applicant checks "Yes" to any item, the Applicant cannot be authorized to proceed with the proposed work until the MDT Environmental Services and/or Transportation Planning, as appropriate, reviews the information and signs the checklist.

G. Applicant must obtain all necessary permits or authorizations from other entities with jurisdiction prior to beginning the proposed action or activity.

Montana's Wild and Scenic Rivers system as published by the U.S. Department of Agriculture, or the U.S. Department of the Interior:

1. Middle Fork of the Flathead River (headwaters to South Fork of the Flathead River confluence)
2. North Fork of the Flathead River (Canadian Border to Middle Fork of the Flathead River confluence)
3. South Fork of the Flathead River (headwaters to Hungry Horse Reservoir)
4. Missouri River (Fort Benton to Charles M. Russell National Wildlife Refuge)

Stream Permitting Guidelines

To be used for informational purposes when filling out the Environmental Checklist for MDT approach permits, encroachment/occupancy permits or Maintenance projects.

The most commonly required permits or authorizations are listed below. **Other permits or authorizations may be required**, and other laws may apply depending on the type and the location of the proposed activity. For more information please refer to "A Guide to Stream Permitting in Montana" available on the Internet at http://www.dnrc.mt.gov/permits/ or from your local conservation district office. (The information provided below was adapted from "A Guide to Stream Permitting in Montana")

Montana Natural Streambed and Land Preservation Act (310 Permit)

Any private, nongovernmental individual or entity that proposes any activity that physically alters or modifies the bed or banks of a **perennially flowing stream** must obtain a 310 permit before beginning work.

Contact the conservation district office to obtain a permit application, fill the application out and submit it to the local conservation district prior to any activity in or near a perennial-flowing stream. Once an application is accepted, a team that consists of a conservation district representative; a Department of Fish, Wildlife and Parks biologist; and the applicant may conduct an on site inspection. The team makes recommendations to the conservation district board, which has 60 days from the time the application is accepted to approve, modify, or deny the permit. Local rules apply. There is no charge for a 310 permit.

For more information, contact your local conservation district or the Conservation Districts Bureau – MT Department of Natural Resources and Conservation at (406) 444-6667, or the Montana Association of Conservation Districts (406) 443-5711

Montana Stream Protection Act (SPA 124 Permit)

Any agency or subdivision of federal, state, county, or city government proposing a project that may affect the natural existing shape and form of **any stream** or its banks or tributaries must obtain a SPA 124 permit before beginning work.

Any agency or unit of government planning a project must submit a Notice of Construction (application) to the Department of Fish, Wildlife and Parks, which has up to 60 days to review the application, perform an on-site investigation, and approve, modify, or deny the application. There is no application fee.

For more information contact the Habitat Protection Bureau – MT Fish, Wildlife and Parks (406) 444-2449.

Montana Floodplain and Floodway Management Act (Floodplain Development Permit)

Anyone planning new construction **within a designated 100 year floodplain** must obtain a floodplain development permit before beginning work. New construction includes, but is not limited to, placement of fill, roads, bridges, culverts, transmission lines, irrigation facilities, storage of equipment or materials, and excavation; new construction, placement, or replacement of manufactured homes; and new construction, additions, or substantial improvements to residential and commercial buildings. Check with local planning officials or the Floodplain Management Section of the Department of Natural Resources and Conservation to determine whether a 100-year floodplain has been designated for the stream of interest.

Floodplain Development Permits are available from the local floodplain administrator, who may be the city/county planner, sanitarian, building inspector, town clerk, or county commissioner.
Permit applications are available from the local floodplain administrator or from the Department of Natural Resources and Conservation. Application fees are established by the local government and vary widely throughout the state. The application process may take up to 60 days. Joint application participant-see Permitting Tips section.

For more information contact the Floodplain Management Section – MT Department of Natural Resources and Conservation (406) 444-0860.

Federal Clean Water Act (404 Authorization or Permit)

Anyone proposing a project that will result in the **discharge or placement of dredged or fill material into waters of the United States** must obtain a 404 authorization or permit before beginning work. "Waters of the United States" include lakes, rivers, streams (including perennial, intermittent, and ephemeral channels with an ordinary high water mark), wetlands, and other aquatic sites.

Anyone planning a project must submit an application to the U.S. Army Corps of Engineers (Corps). The U.S. Environmental Protection Agency also has regulatory review and enforcement functions under the law. Permit authorization varies depending on the size and scope of the intended project.

Activities that meet the conditions for a Nationwide or Regional General Permit may be approved in 10 to 45 days. Individual Permits require more extensive review and require a public notice period. Permit approval may take 90 to 120 days. Application fees for Individual Permits may vary from $10 for private individuals to $100 for commercial applicants. Do not send money with the application. Applicants will be notified if a fee applies.

For more information contact the U.S. Army Corps of Engineers, 10 West 15th Street, Suite 2200, Helena, MT 59626, Phone (406) 441-1375.

Short-term Water Quality Standard for Turbidity (318 Authorization)

Anyone initiating construction activity that will cause **short term or temporary violations of state surface water quality standards for turbidity in any "State water"** must obtain a 318 Authorization before beginning work. "State water" includes any body of water, irrigation system, or drainage system, either surface or underground, including wetlands, except for irrigation water where the water is used up within the irrigation system and the water is not returned to other state water.

A 318 Authorization must be obtained prior to initiating a project. The authorization may be obtained from the Department of Environmental Quality, or may be waived by the Department of Fish, Wildlife and Parks during its review process under the Natural Streambed and Land Preservation Act (310 Permit) or the Stream Protection Act (SPA 124 Permit).

Individual applications submitted to the Department of Environmental Quality are normally processed within 30 to 60 days. Authorizations waived under the 310 or SPA 124 permit processes correspond to the time frame under each permit system, usually 30 to 60 days. There is an application fee of $150.00 (make check or money order payable to Water Protection Bureau, Department of Environmental Quality).

For more information contact the Water Protection Bureau – MT Department of Environmental Quality (406) 444-3080.

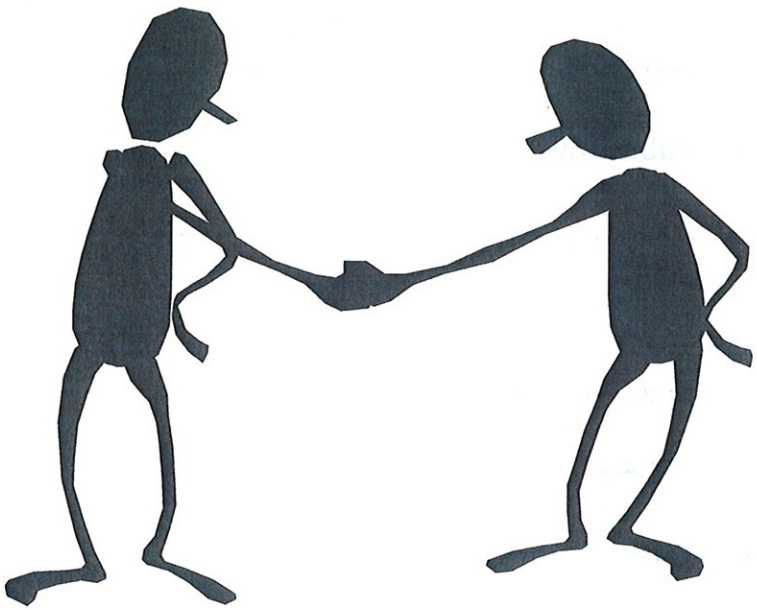
Storm Water Discharge General Permits

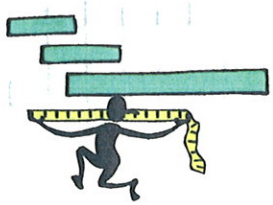
Anyone proposing a construction **activity that will disturb one or more acres**, a defined industrial activity; a mining or oil and gas activity in which storm water will come into contact with overburden, raw material, intermediate products, finished products, or waste products located on the site of such operations (including active and inactive mine sites); or other defined activity that **has a discharge of storm water into surface waters**. Permit authorization is typically obtained under a Montana Pollutant Discharge Elimination System (MPDES) "General Permit".

For storm water discharges associated with construction activity, permit authorization is effective upon Department receipt of a complete Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and fee. This must be received no later than the construction activity start date. For other regulated storm water discharges, a complete Application Form, SWPPP (except for Small MS4s), and fee must be received for review at least 30 days prior to the discharge of storm water from the facility or activity. Fees vary depending on the type of permit. Contact the Department or visit the website listed below for various storm water discharge "General Permits," Application/NOI Forms, fee schedule, and other permitting forms/information.

For more information contact the Water Protection Bureau – MT Department of Environmental Quality, (406) 444-3080, http://www.deq.mt.gov.

Guide to the System Impact Process





Transportation Planning and Programming Division
Program and Policy Analysis Bureau
2701 Prospect - P.O. Box 201001
Helena, MT 59620-1001
May 2005

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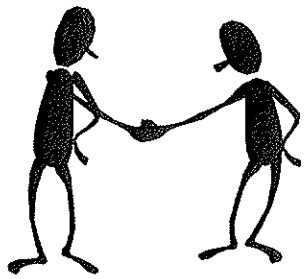
Working Together To Preserve Montana's Transportation System



The System Impact Action process is a coordinated review of projects initiated outside of MDT that may significantly and permanently impact the transportation system. The goals of this process include:

- Provide an avenue for private developers to request access to and from the state highway system.
- Facilitate a timely review of the developers request amongst a varied group of MDT Technical offices
- Identify reasonable accommodation of the developer's project needs
- Preserve the safety and efficiency of Montana's transportation system.
- Protect taxpayer investments by recovering costs from developers for their project's impacts to the transportation system.
- Ensure MDT permitting does not precede an environmental process (NEPA/MEPA)

Coordinated through the Program and Policy Analysis Bureau
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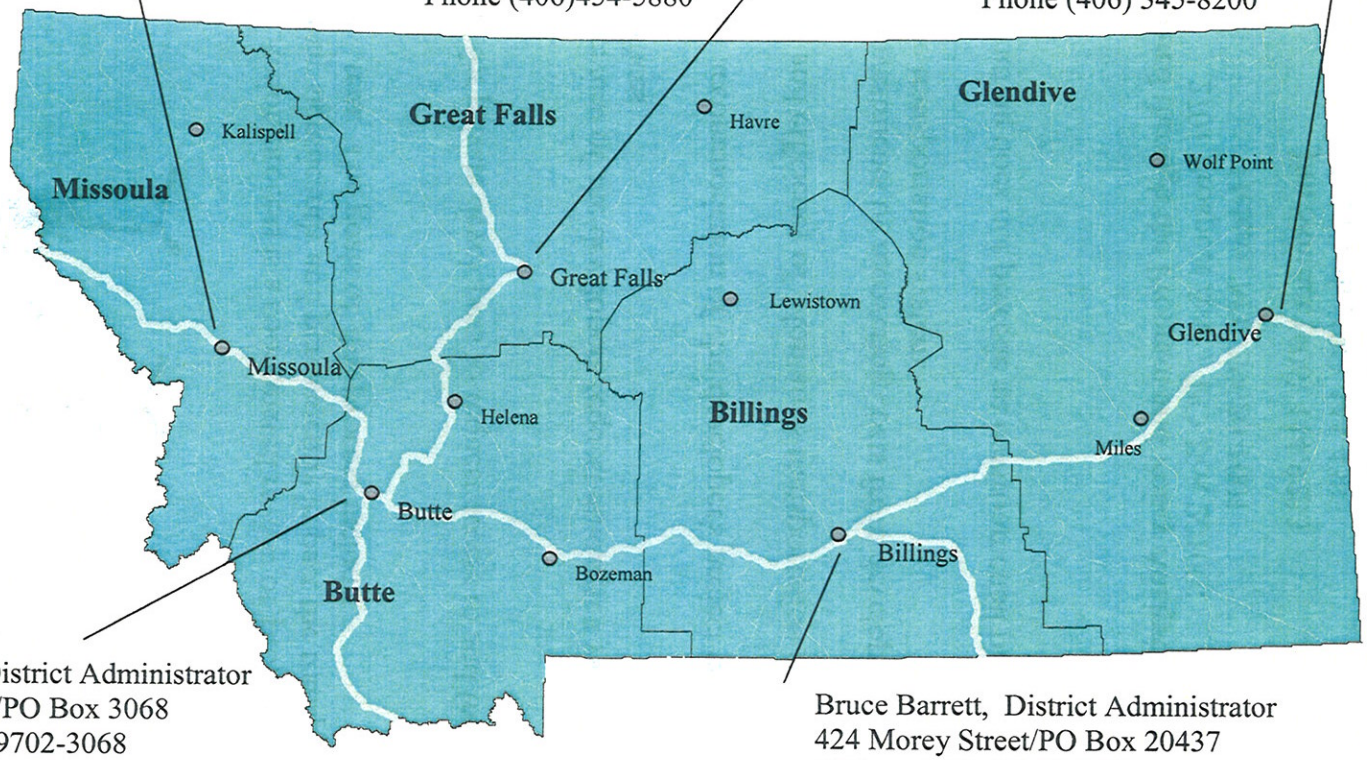

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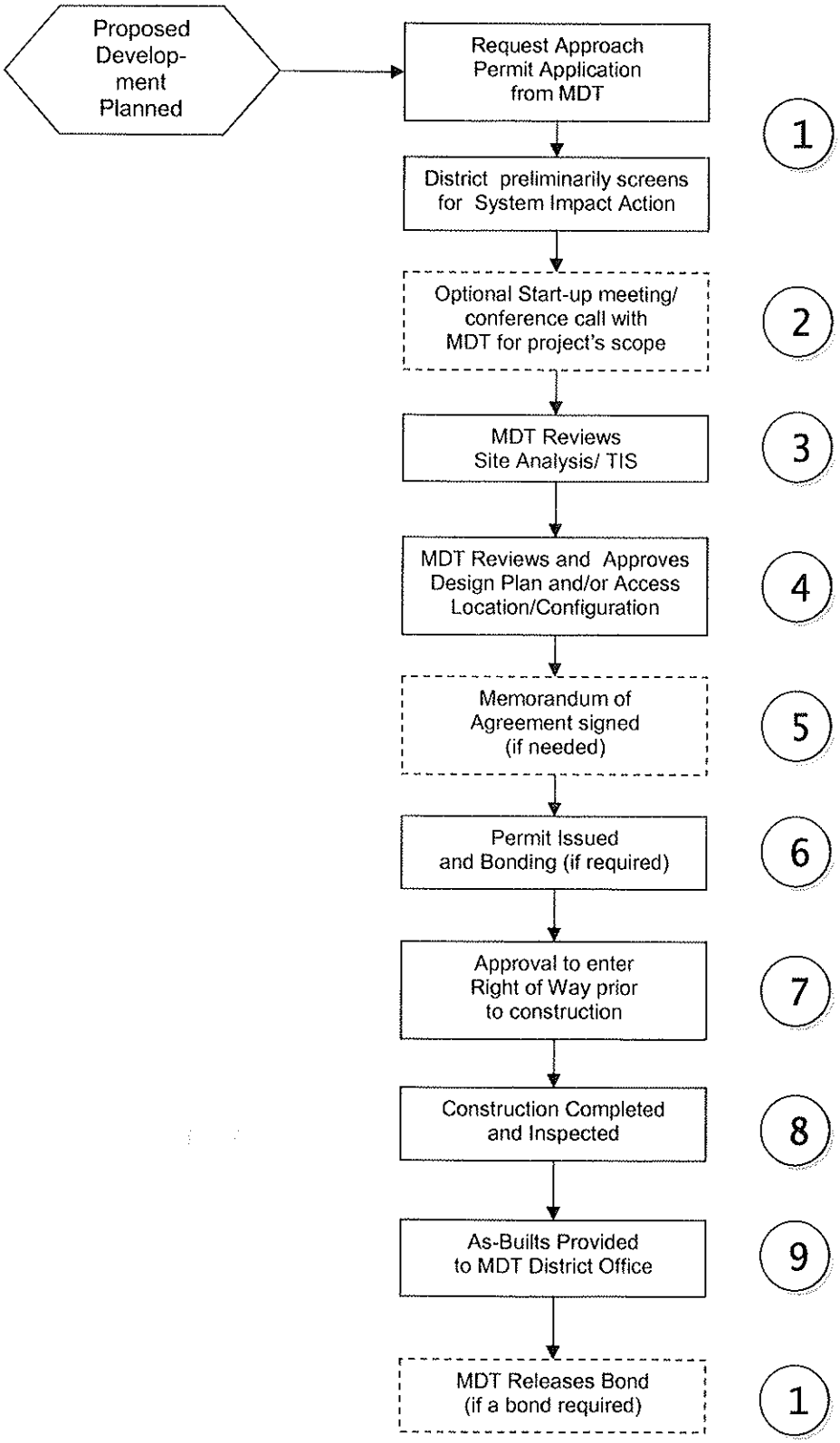
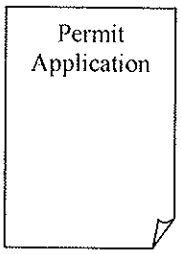
System Impact Action Process

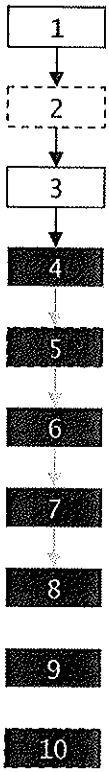


See following process steps for definition and submittal requirements

System Impact Action Process Steps

1. Developer submits an approach or utility permit application to MDT-District Office.

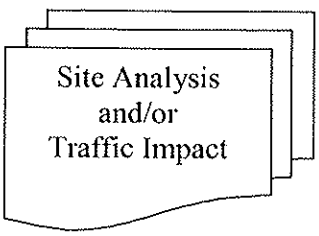




2. The optional Start-up meeting with MDT is to scope new projects with the developer(s) and/or their consultants. This meeting is to determine the detail needed for system impact assessment, whether it is a high-level site analysis or an in-depth Traffic Impact Study. If you have worked with MDT on prior projects, you may opt to go directly to activity three.

3. MDT reviews the Site Analysis/Traffic Impact Study and identifies conditions for concurrence with the developments identified needs and the associated impacts and mitigation measures to be addressed.

The time required to review and approve the Study is directly related to the quality of the analysis and recommendations. If the study is sub-standard the Developer/Consultant must correct the document and resubmit.



System Impact Action Process Steps

4. MDT approves Access Location and/or Design Plan provided by developer. The complexity of this activity is dependent on size and type of development, the location of the project site and the level of access control existing on the associated transportation facility.

Final Roadway Improvement Plans

Final Signal Plans (if needed)

5. If determined in the previous activities that a Memorandum of Agreement (MOA) is needed for this project, both the developer and MDT must sign before proceeding on to the next activity. The MOA defines the agreement of responsibilities between MDT and the Developer. *The local government (City/County) participates in the mitigation decisions and concurs with the MOA.*

Review and Sign MOA

6. MDT District office issues the permit. If a bond is required, it must be in place prior to MDT issuing the permit.

Construction Bond (if req'd)

1
2
3
4
5
6
7
8
9
10

System Impact Action Process Steps (continued)

7. The developer must gain approval from MDT's District Office to enter the right-of-way prior to beginning construction. It is required that an approved Traffic Control Plan be submitted at this time.

Traffic Control Plan

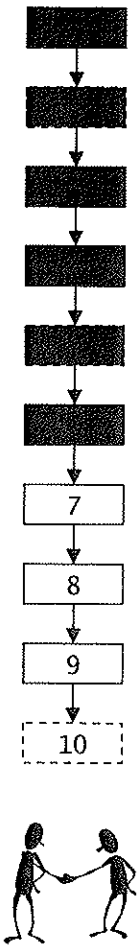
8. Construction is complete for the road system impacts. The district must inspect the project to the permit or MOA conditions. The developer/consultant must forward the inspection sign-off sheet to MDT Headquarters to be kept on file.

Construction Inspection Signoff

9. As-built plans must be provided to the MDT District Office to be kept on file.

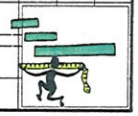
As-Built Plans

10. As agreed with the terms of the bond, MDT releases the bond.



Timeline for System Impact Action Process

Step	Item	1	Project Dependent	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Construction
1	Project Identified as a System Impact Action																			
2	Study Scope Meeting or Conversation with Developer																			
2	Complete Traffic Impact Study or Site Analysis																			
2	Clear Other Agencies																			
2	Address Drainage/Hydraulics																			
2	Address R/W and Utilities																			
3	MDT Reviews and Comments			***		***		Per resubmittal												
3	Meeting to Discuss Comments																			
3	Negotiate Mitigations						as needed													
3	Draft MOA																			
4	Develop Preliminary Design Plans																			
4	Review Preliminary Design Plans													***		***				
4	Plan-in-Hand Meeting																			
5	Finalize MOA																			
6	MDT Concurs with Design																			
6	Issue Permit																			
7/8	Implementation and Oversight																			
9	Provide As-Builts to MDT																			
	MDT Actions																			
	Developer/Consultant Actions																			
	Combined Actions																			
	Project Specific																			
	Review time dependent upon the quality of submittal	***																		



Appendix

System Impact Action Criteria

New developments requiring off site improvements will be considered a System Impact Action. The Transportation Planning Division coordinates the review process. The following is a guideline for developments, which may require off site improvements and generally follow the System Impact Action process.

*Developments generating 150 trips per hour **

Type of Land-use Development	**Example**
Commercial	Single Outlet Retail Multi-Unit Retail Development Regional Shopping Center High turn over sit down restaurant Motel Convention Center or Arena
Residential	Single family, Multi Family, etc. (total dwellings may come in multiple phases)
Industrial	Heavy Industrial (generating C-70 or C-50 trucks)
Institutions	Schools adjacent to a State Highway
Offices	General Office Building
Multiple Developments	Commercial/Residential; Light Industrial/Commercial; etc.

** Trips per peak hour where the vehicular trip is defined as a one-way journey of a motorized vehicle*

Developments accessing an Access Control Facility

New Access	New Development
Existing Access	Change in property use: Change in zoning Construction of new buildings Increase in floor space of existing building Division or consolidation of property boundaries Change in the character of the traffic using the approach; or Change in internal circulation design Re-establishment of a property's use, that had been unused for two years

Other proposals/developments transmitted to Transportation Planning for initial evaluation:

- New access roadway request – has the potential to open up existing undeveloped land and would be dedicated public right of way.
- Operational/safety issues that may require engineering solutions such as turn lanes or signals. Includes at-grade or above grade railroad crossing.
- The access would serve a major mine greater than 5 acres
- In cases not meeting the System Impact Criteria, the district must confirm that other state and/or federal permits and environmental analysis are completed. MDT will not issue permits in advance of other permitting.

If it is determined an engineering solution is not needed, the development will NOT continue through the Systems Impact Action Process. Review/coordination reverts to the appropriate District. At anytime the District has uncertainties regarding any project; they may contact the Transportation Planning Division to determine if the project should go through this coordinated review process.

Summary of Submittals
Commonly Required for System Impact Action

Process Flow Step	Submittal	Point of Contact	Comments
1	Permit Application	MDT District Office	Forwards to Headquarters if a System Impact Action
	Physical Environment Checklist		Completes and forwards to Headquarters
3	Traffic Impact Study	MDT Headquarters - Transportation Planning	Determined in initial planning meeting or staff review
	Signal Warrant Analysis		as needed
	Preliminary Roadway Improvement Plans		Must depict location and design
	Preliminary Signal Plans		as needed
	Drainage Report		as needed
	Geologic Analysis		as needed
	Design Exception Request		as needed
	Other Agency Approvals		as needed - Confirmed prior to granting permit
4	Final Roadway Improvement Plans		All MDT Pre. Plan Comments Addressed
	Final Signal Plans		as needed
5	Review Memorandum of Agreement & Re-spond		as needed
6	Bonding for Construction		as needed
	Traffic Control Plan	MDT District Office	project specific
8	Construction Inspection Sign-Off		as needed
9	As-Built Plans		MDT keeps these on file
	Other items may be required	MDT Headquarters - Transportation Planning	project specific

Addresses and telephone numbers may be found on the introduction and district pages

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Definition of Terms

The following definitions are for clarification of terminology used in this handout:

As Built Drawings – The contract drawings which show the actual location, character and dimensions of the completed work, including layouts, profiles, cross sections and other details.

Capacity – The maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic and control conditions.

Capture Traffic – Those trips which are internal to the site plan making multiple stops within the development.

Cultural Resource – properties that are protected as historic and/or archeological resources.

Department – The Montana Department of Transportation.

Developer - The landowner or otherwise bona-fide applicant of an approach permit or development proposal.

Level of Service (LOS) – A set of criteria that describes the degree to which intersections, roadway, weaving section or ramp can effectively serve peak-hour and/or daily traffic. Levels of service definitions are provided in the Highway Capacity Manual.

MDT – The Montana Department of Transportation.

MOA – Memorandum of Agreement.

MOU – Memorandum of Understanding.

On-Site Circulation – Vehicular network which primarily accommodates site-generated traffic within the site boundary and includes roadways, parking lots loading docks, parking garages and parking deck travelways.

Pass-by Trips – Those trips that are diverted from traffic already on the roadway system.

Site Access Plan - A scaled drawing that explicitly illustrates the location, configuration and geometrics of all site approaches in relation to the local highway system and other approaches. The site access plan should also illustrate the supporting internal circulation, parking and loading facilities of the development, the footprints of key building structures and any out-parcel locations, and the type and location of any required off-site improvements.

System Impact Action Process – An internal MDT process for the review and assessment of development projects that significantly and permanently impact the Sate transportation system.

Traffic Generation – The estimated number of origins from and destinations to a site resulting from the land-use activity on that site.

Traffic Impact – the effect of site traffic on highway operations and safety.

Traffic Impact Analysis – An engineering and traffic study that determines the potential traffic impacts of a proposed traffic generator. A complete analysis includes an estimation of future traffic with and without the proposed generator, analyses of the traffic impacts and recommended roadway improvements that are necessary to accommodate the additional site traffic.

Traffic Impact Mitigation – The reduction of traffic impacts on roadways and/or intersections to an acceptable level of service.

Vehicular Trip – A single or one-way vehicular trip with its origin (i.e. out bound), destination (i.e. inbound) or both trip ends made inside the study area.

Physical Environment Checklist

	Resource	Yes	No
1	Does your project have an impact on any cultural resource? (Section 106)		
2	Does your project have an impact on air, noise or water quality?		
3	Does your project have impacts to wetlands?		
3a	If the answer to number 3 is yes, is a Clean Water Act ' 404 permit authorization required?		
4	Is there documented controversy on environmental grounds? (ex. Has the applicant received a letter or petition from an environmental org.?)		
5	Does the proposed project involve hazardous waste site(s)? (ex. Superfund, spills, underground storage tanks, etc.)		
6	Does the proposed project require other governmental permits, licenses, easements, etc.? If the answer is "yes" please describe in detail the full extent of the project and any other permits, licenses, easements, etc., which may be necessary.		
7	Does the propose project permanently impact the transportation network in terms of increased traffic volumes, increased weight or increased delays on state roadways?		
8	Does the proposed action have permanent impacts on other forms of transportation (rail, transit or air movements)?		
9	Does your proposed action alter drainage patterns or increase runoff to the highway facilities or Right of Way		

A. The applicant shall complete the checklist indicating a "Yes" or "No" for each item. The applicant shall complete the checklist indicating a "Yes" or "No" for each item.

B. When a "Yes" is indicated on any items, the applicant must explain the impacts. Or, If the applicant checks "No", and the District indicates there may be potential impacts, the item will be forwarded to Environmental Services.

C. These impacts must be mitigated with the proper Agencies prior to permit issuance.
   - C1. Section 106 impacts require coordination between MDT, FHWA, State Historic Preservation Office & Advisory Council on Historic Preservation #1.
   - C2. Montana Department of Environmental Quality approves mitigation measures for #2 and #5.
   - C3. Army Corp of Engineers approves of mitigation measures for #3.
   - C4. Montana Department of Transportation approves mitigation measures for #6, #7, #8 and #9.
   - C5. Montana Association of Conservation Districts publishes "A Guide to Stream Permitting in Montana". All permits regarding floodplains, wetlands, streambanks and streambeds are addressed in the pamphlet.

D. The applicant will obtain all necessary permits or authorizations from other entities with The applicant will obtain all necessary permits or authorizations from other entities with jurisdiction prior to beginning construction of the project.

Montana Department of Transportation
Traffic Impact Study Checklist

Report Item	Details	√
Project Description		
Site Plan	Development (scaled)	
	w/ Neighboring area (scaled)	
	Plans should include a "best estimate" of future development	
Development Phasing and Timing	Multiple Stages (?)	
Existing Traffic Volumes (Base)	Current Daily and Hourly Volumes	
	Recent Intersection Turning Movements	
Existing Traffic Conditions	Lane Configuration (Adjacent Roadways & Intersections)	
	Traffic Control devices	
	Transit Service	
	Level of Access Control	
Projected Traffic	Trip Generation per ITE	
	AM / PM peaks ADT (others as needed)	
	Pass-By and CaptureTraffic	
	Trip Distribution	
	Approach and Roadway Assignment	
	Full development (Projected base + site traffic)	
Traffic Analysis	Capacity Analysis and LOS	
	Existing (base non-site traffic)	
	Full development (Existing + site traffic)	
	Traffic Operation - Access Design	
	Traffic Operation - Lane Assignment	
	Site Circulation and Parking (Impact on accessibility)	
	Pedestrian Access Considerations	
Truck Access	Approach - delivery vehicles use (Identify)	
	Turning Movements - sufficient radius of turn	
Other Transit Considerations	Rail, Bus and Bicycle (Site Dependent)	
Improvement Analysis	Accommodate Site Access	
	Accommodate Adjacent Roadway and Intersection Function	
	Alternatives	
Conclusions and Recommendations	Including Mitigations Developer Commits to	
Appendices	Traffic Counts	
	Capacity Analyses Worksheets	
	Traffic Control Needs Studies	
	Traffic Signal Needs Studies	

Montana Department of Transportation
Additional Systems Impact Information Checklist

Report Item	Details	√
Hydraulic Analysis	Hydraulic Site Detail (w/ Topographic overlay)	
	Hydraulics report (When requested)	
Environmental Analysis	Complete Environmental Check list	
	Cultural Resources (Identify when requested)	
	Local Land use Plan (When Requested)	
	MTDEQ Storm water Discharge NOI Verification Letter - (Required if more than 1 acre disturbed)	
	Other Fed or State Agency Permits (DEQ, COE, FWP,)	
Construction Analysis	Construction site Details for development (When Requested)	
	Construction Details of Mitigation Facilities (When Requested)	

MDT attempts to provide accommodations for any known disability that may interfere with a person participation in any service, program or activity of the Department. Alternative accessible formats of this information will be provided upon request. For further information call (406) 444-6111 or TDD (406) 444-7696.

SECTION 3
HUFFINE LANE ACCESS MANAGEMENT PLAN DETAILS

The accompanying graphics illustrate the important details of the "Huffine Lane Access Management Plan." Key elements of this plan are:

- The limits of the "Huffine Lane Access Management Plan" are Four Corners (Jackrabbit Lane) on the west and College Street in Bozeman on the east.
- A raised median will ultimately be constructed within the limits of the "Huffine Lane Access Management Plan" corridor.
- This median will restrict full access (left turns in, left turns out, right turns in, right turns out, and north/south through movements) to approved access locations via breaks located at approximately a one-half mile spacing to public streets along the corridor, as shown on the accompanying graphics.
- Future traffic signals will be allowed only at the approved full turning movement locations.
- The east Arrowhead Trail and Huffine Lane intersection will be allowed to remain a full turning movement access (but without a traffic signal) until such time as a documented crash problem is identified. If a documented crash problem is identified in the future of such a severity that the Montana Department of Transportation determines the situation must be addressed, the Montana Department of Transportation reserves the right to install any countermeasure it feels appropriate to protect public safety. These countermeasures may include, but are not limited to: closing the median break and restricting the intersection to a right in, right out only intersection; restricting the intersection to a three-quarter turn (left in, right in, right out) only intersection, or installing a traffic signal.
- The raised median will provide breaks for three-quarter turn intersections at public street intersections to Huffine Lane located approximately one-quarter mile east or west of approved traffic signal locations, as shown on the accompanying graphics. A three-quarter turn intersection allows left turns in from Huffine Lane into an access; right turns from Huffine Lane into an access; and right turns out from an access onto Huffine Lane. However, left turns out from an access onto Huffine Lane and through movements across Huffine Lane from an access are prohibited at the three-quarter turn locations.
- All other accesses to Huffine Lane will be restricted to right in and right out turning movements only.
- U-turns will be provided for approximately 500 feet in advance of approved traffic signal locations (whether signals are currently provided, or allowable in the future).
- U-turns will be allowed along with left turns from Huffine Lane at signalized intersections, unless documented crash problems leads the Montana Department of Transportation to restrict such U-turns for safety reasons.
- A supplemental street network north and south of Huffine Lane is recommended to maximize access to parcels of land abutting or close to Huffine Lane, and to provide internal circulation among parcels. A framework for this recommended supplemental street network in shown in *Section 5 – "Possible and Desirable Future Public Street Network."*
- In order to accommodate the planned future raised medians, left turn bays, and U-turn bays, the existing pavement width of 78 feet on Huffine Lane (see Figure 1) will need to be widened five feet on both the north and south side of Huffine Lane, for a

total future pavement width of 88 feet (exclusive of acceleration, deceleration, or right turn auxiliary lanes), shown in the other graphics on Figures 1 and 2.

- Figure 3 illustrates typical future full median area, left turns/U-turns, and 3/4 turns locations in plan view on the aerial background.
- To be consistent with the "Greater Bozeman Area Transportation Plan, Year 2001 Update" standards for a Principal Arterial Street (Figure 4), the future right-of-way for Huffine Lane is planned to be 120 feet (60 feet each side from centerline).

Figures showing Huffine Lane Access Management Plan details included in this section are:

Figure 1 – Typical Sections, Existing Conditions and at Future Full Width Median (Section A – A) Locations

Figure 2 – Typical Sections at Future Left Turn Lane or U-Turn (Section B – B) and 3/4 Turn (Section C – C) Locations

Figure 3 – Plan View of Typical Future Full Median, Left Turn or U-Turn, and 3/4 Turn Locations

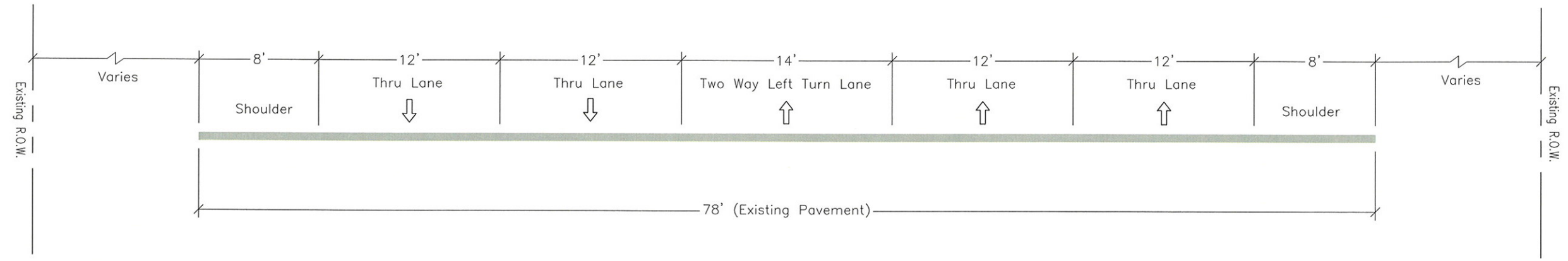
Figure 4 – This is Figure 11-4 from the "Greater Bozeman Area Transportation Plan, Year 2001 Update," showing the Recommended Principal Arterial Street Standards and the 120 foot right-of-way requirement applicable to Huffine Lane.

Figures 5 – 22 – Huffine Lane Access Management Plan Corridor Detail Sheets

Note: The Figures shown in this section were created for an 11" by 17" sheet size. The scales shown on the sheets are for an 11" by 17" sheet size. If sheets are printed out on 8-½" by 11" paper, the scales must be adjusted accordingly.

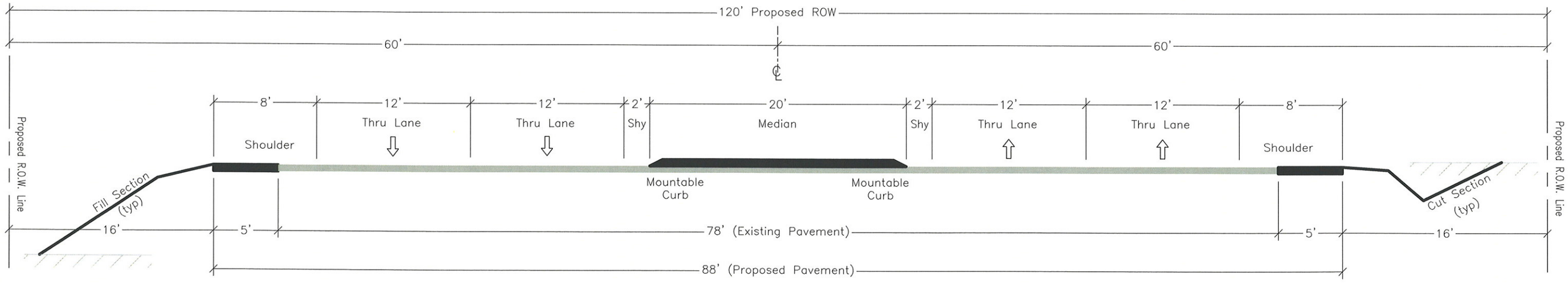
TYPICAL SECTION

(Existing Conditions)



TYPICAL SECTION A-A

(at Future Full Width Median Locations)



SCALE IN FEET
0 4' 8'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

TYPICAL SECTIONS, EXISTING CONDITIONS AND AT FUTURE FULL WIDTH MEDIAN LOCATIONS

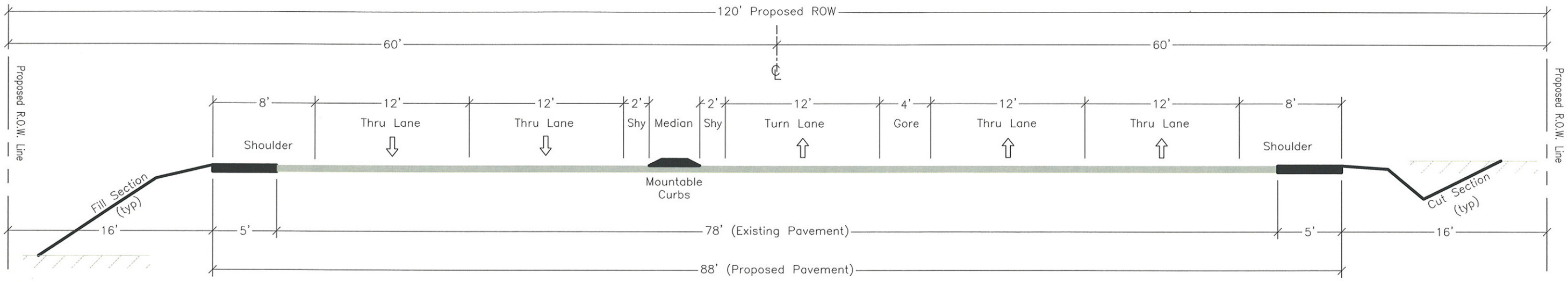
Scale	1"= 8' (11X17)	Date	August 2007	Drawn by	RAC	Job #	AMTDOT0307	Section 3 Figure 1

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

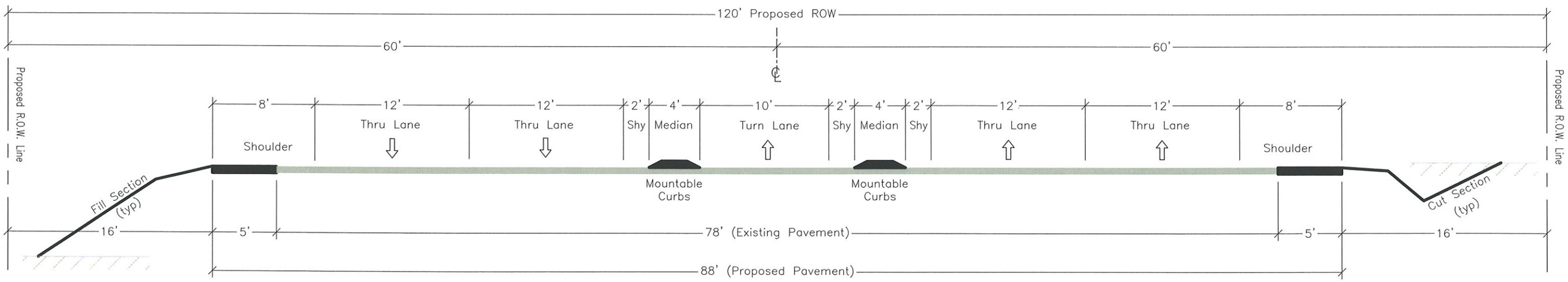
TYPICAL SECTION B-B

(at Future Left Turn Lane or U-Turn Locations)



TYPICAL SECTION C-C

(at Future 3/4 Turn Lane Locations)



SCALE IN FEET
0 4' 8'

SEH

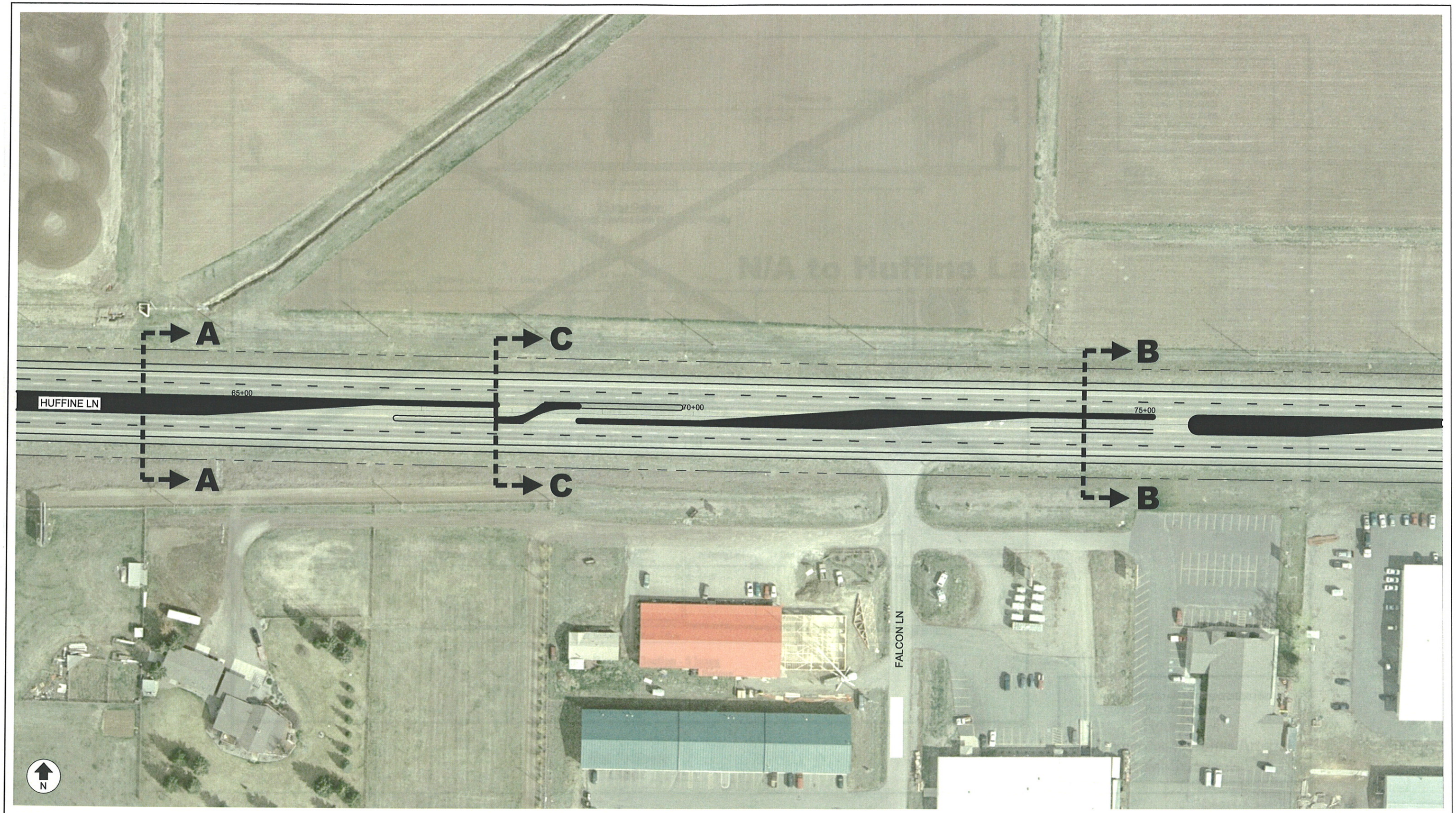
HUFFINE LANE ACCESS MANAGEMENT PLAN

TYPICAL SECTIONS AT FUTURE LEFT TURN LANES OR U-TURN AND 3/4 TURN LOCATIONS

Scale 1"= 8' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 2

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

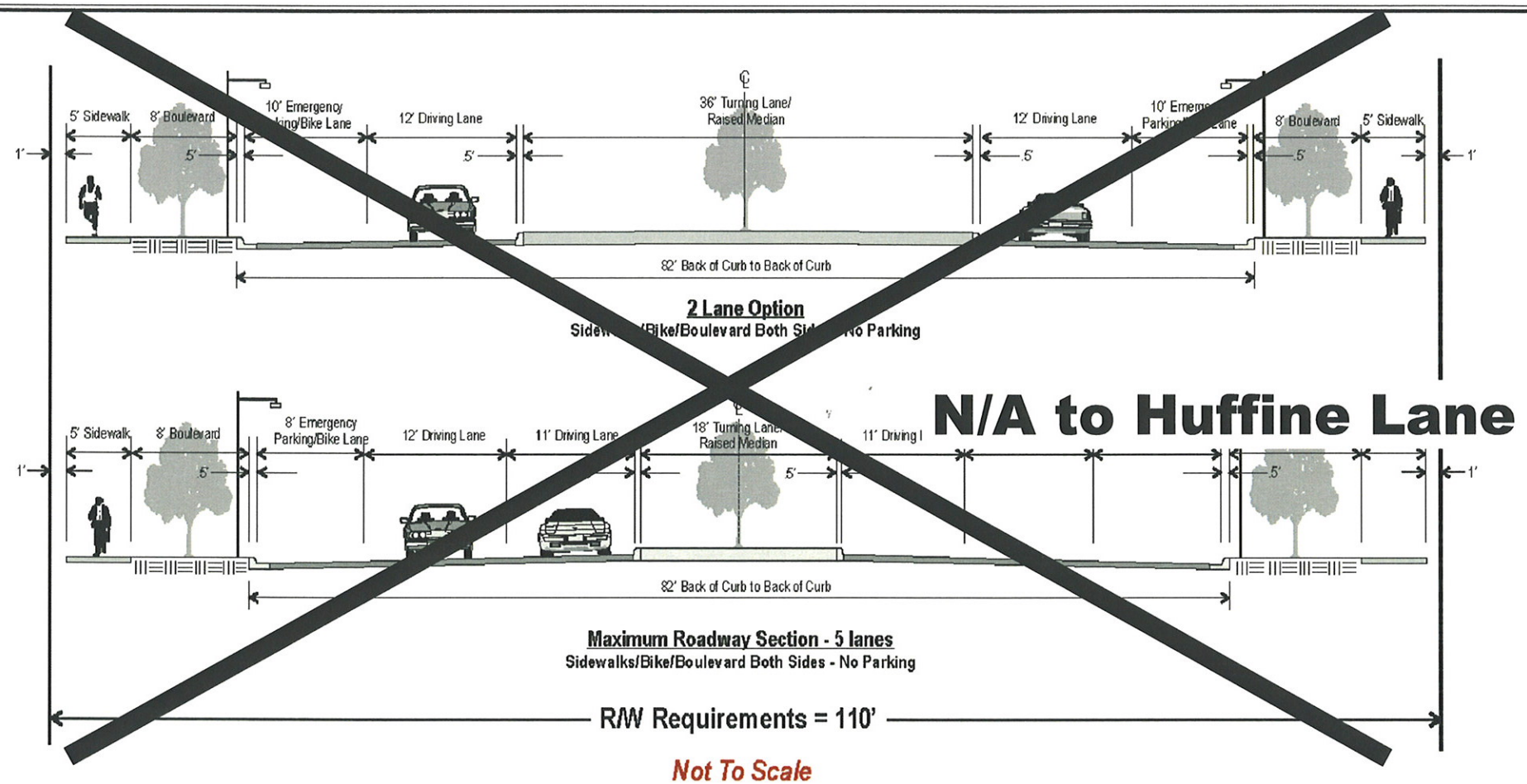
HUFFINE LANE ACCESS MANAGEMENT PLAN

PLAN VIEW OF TYPICAL FUTURE FULL MEDIAN, LEFT TURN, AND 3/4 TURN LOCATIONS

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 3

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



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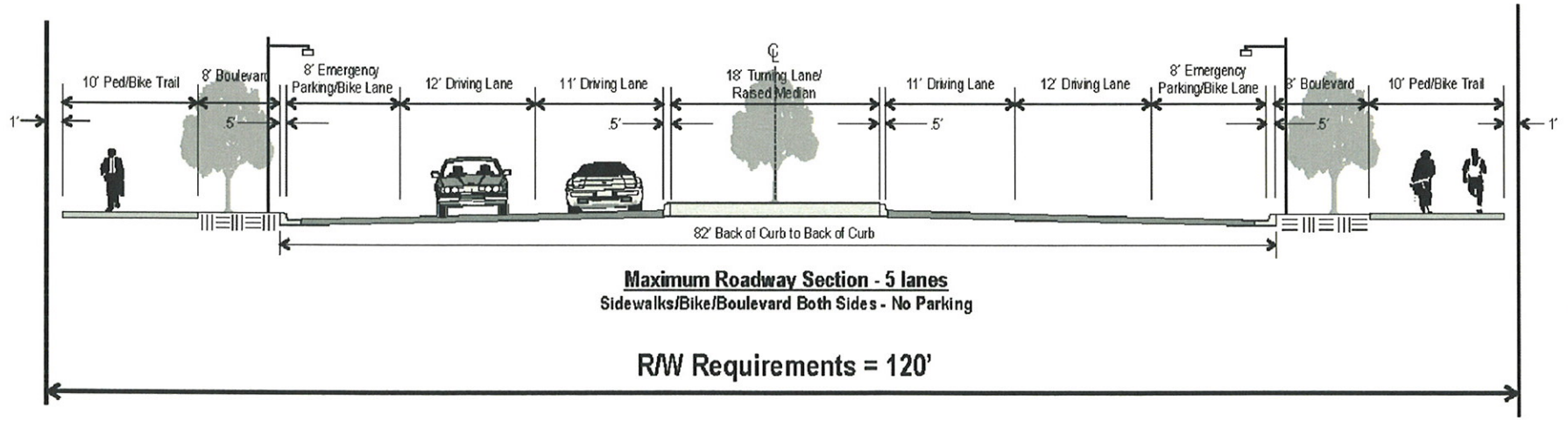


Not To Scale

Minimum Features:
- Two Driving Lanes
- Sidewalks - Both Sides
- Bike Lanes - Both Sides
- Boulevards - Both Sides
- Parking - Both Sides
  (Where Parking is Provided)

NOTES:
- Pedestrian crossing safety enhancement is required for roads wider than 2-lanes.
- Corridor lighting is required wherever raised medians are used.
- Grade separated ped/bike facilities should be considered at major ped/bike crossings.

Greater Bozeman Area Transportation Plan
Year 2001 Update
Figure 11-4
Recommended Principal Arterial Street Standards

SEH

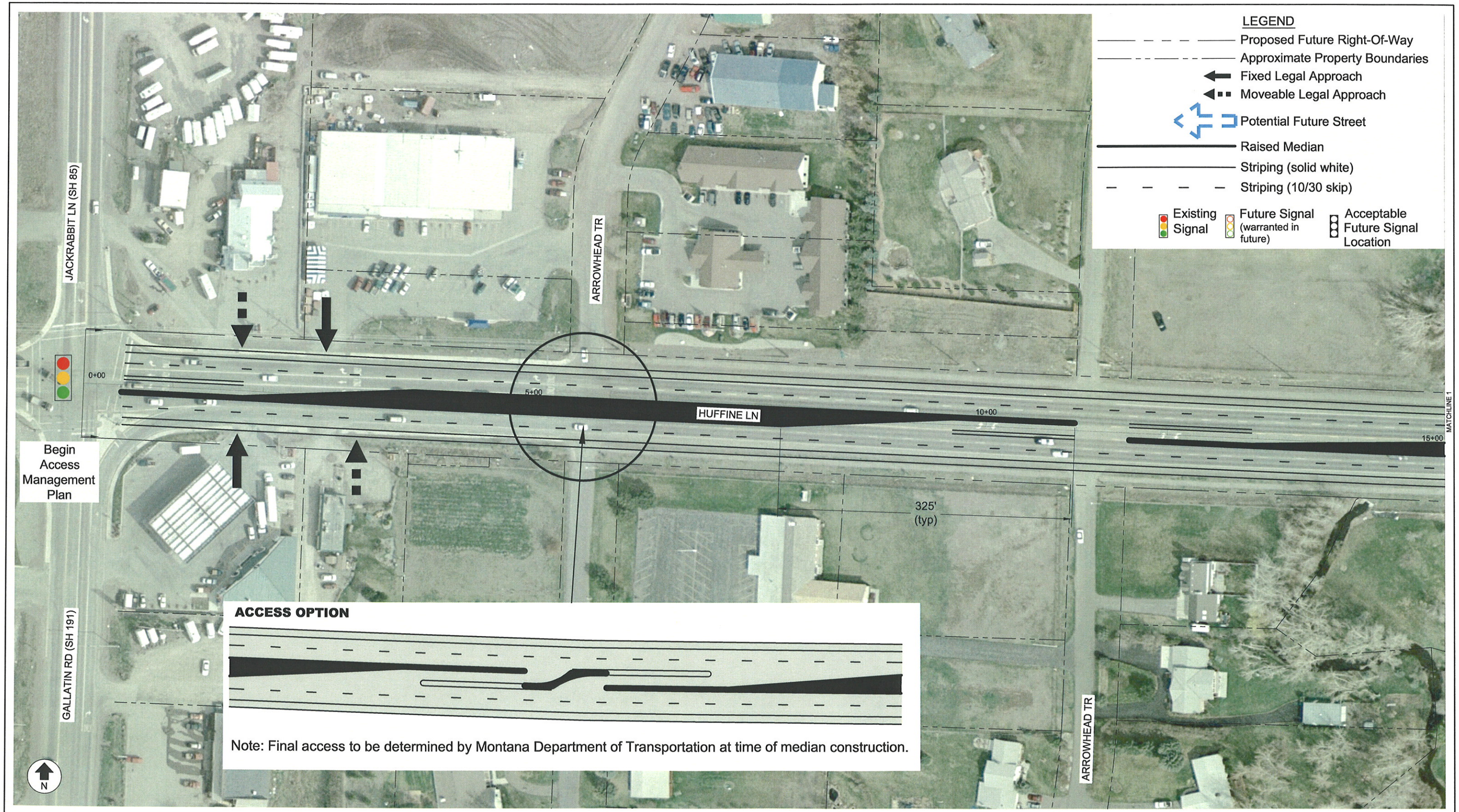
HUFFINE LANE ACCESS MANAGEMENT PLAN

RECOMMENDED PRINCIPAL ARTERIAL STREET STANDARDS

Scale 1"=100' (11X17)	Date June 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 4

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	Date	Drawn by	Job #	
1"=100' (11X17)	August 2007	RAC	AMTDOT0307	Section 3 Figure 5

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BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 6

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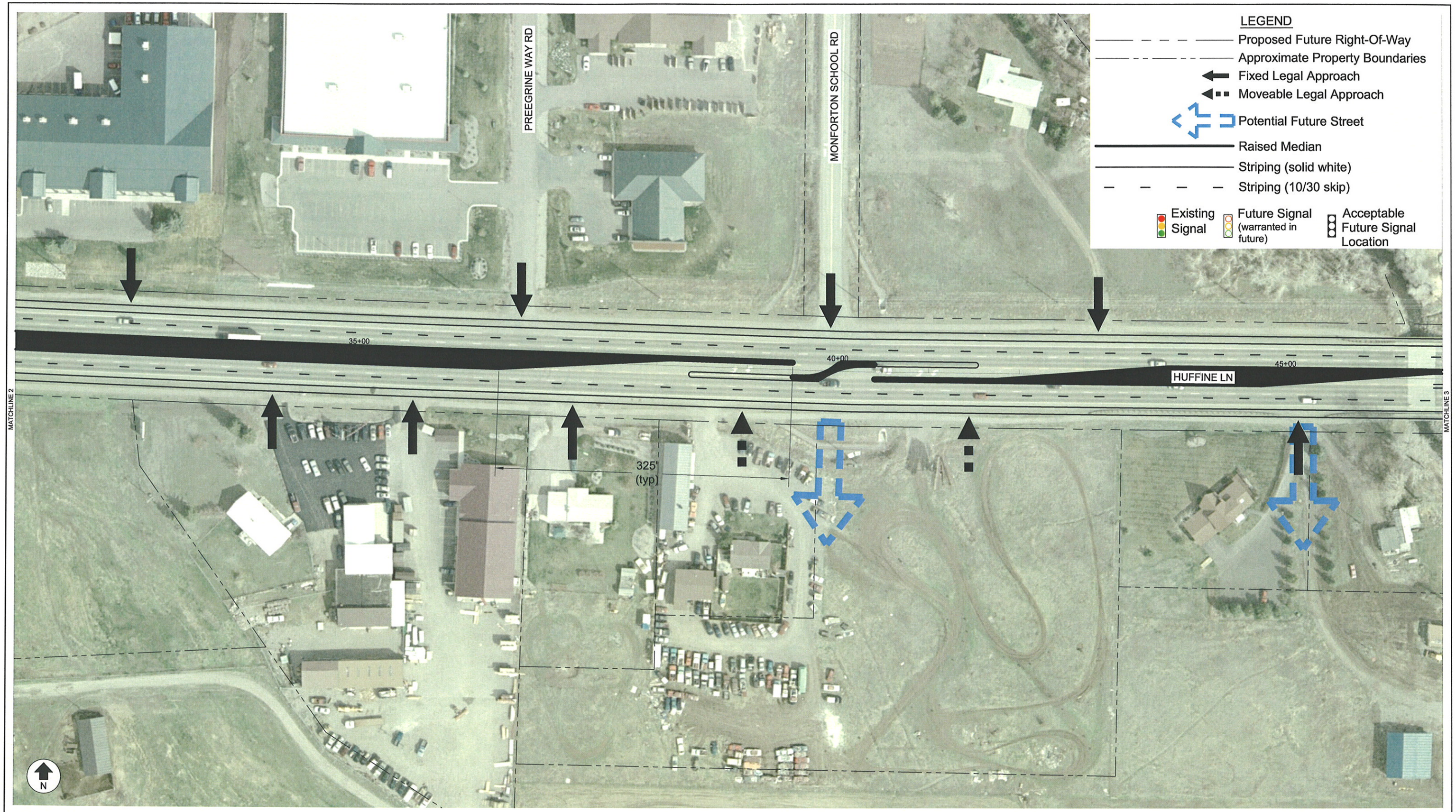
BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 7

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 8

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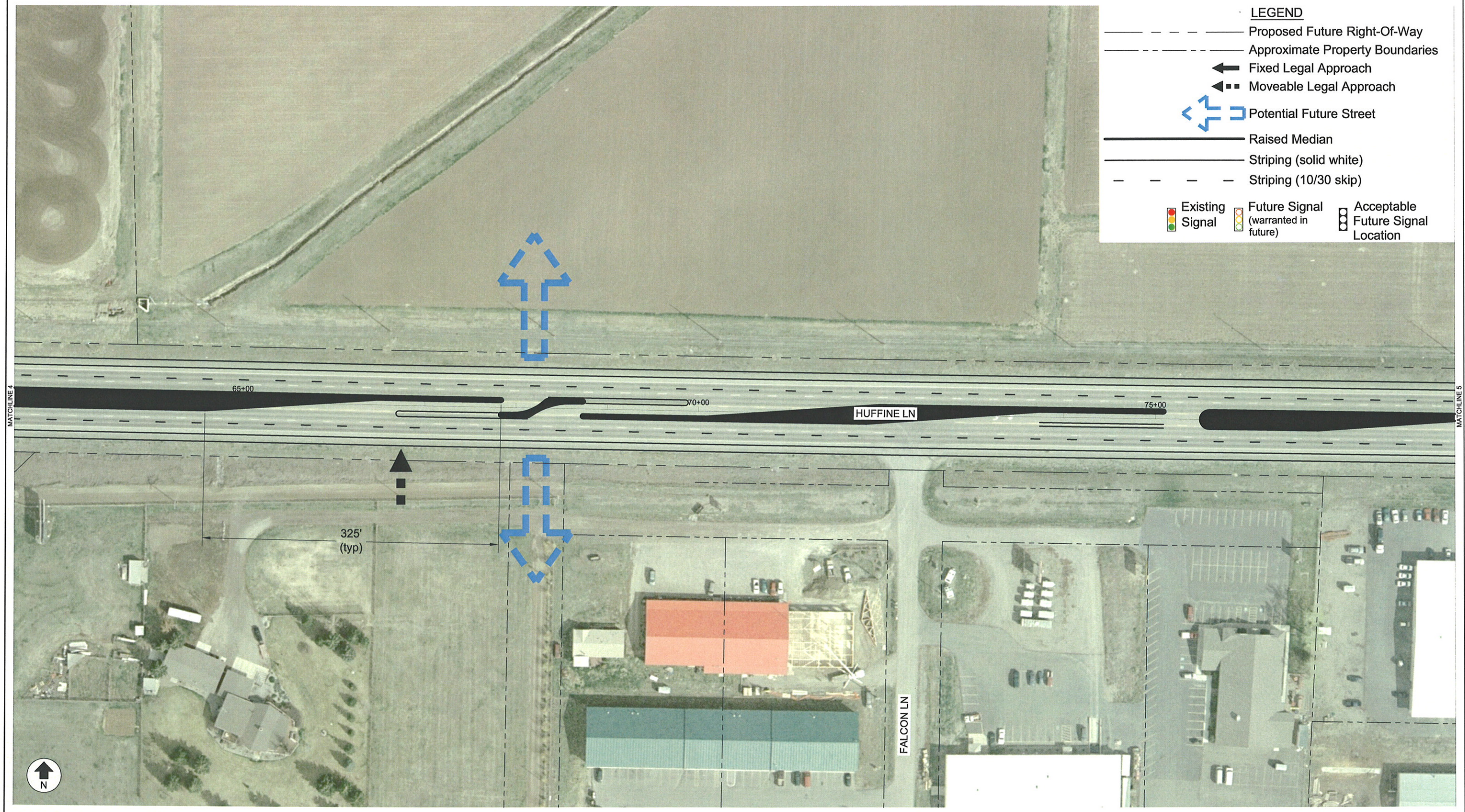
BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 9

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BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	1"=100' (11X17)	Date	August 2007	Drawn by	RAC	Job #	AMTDOT0307	Section 3 Figure 10

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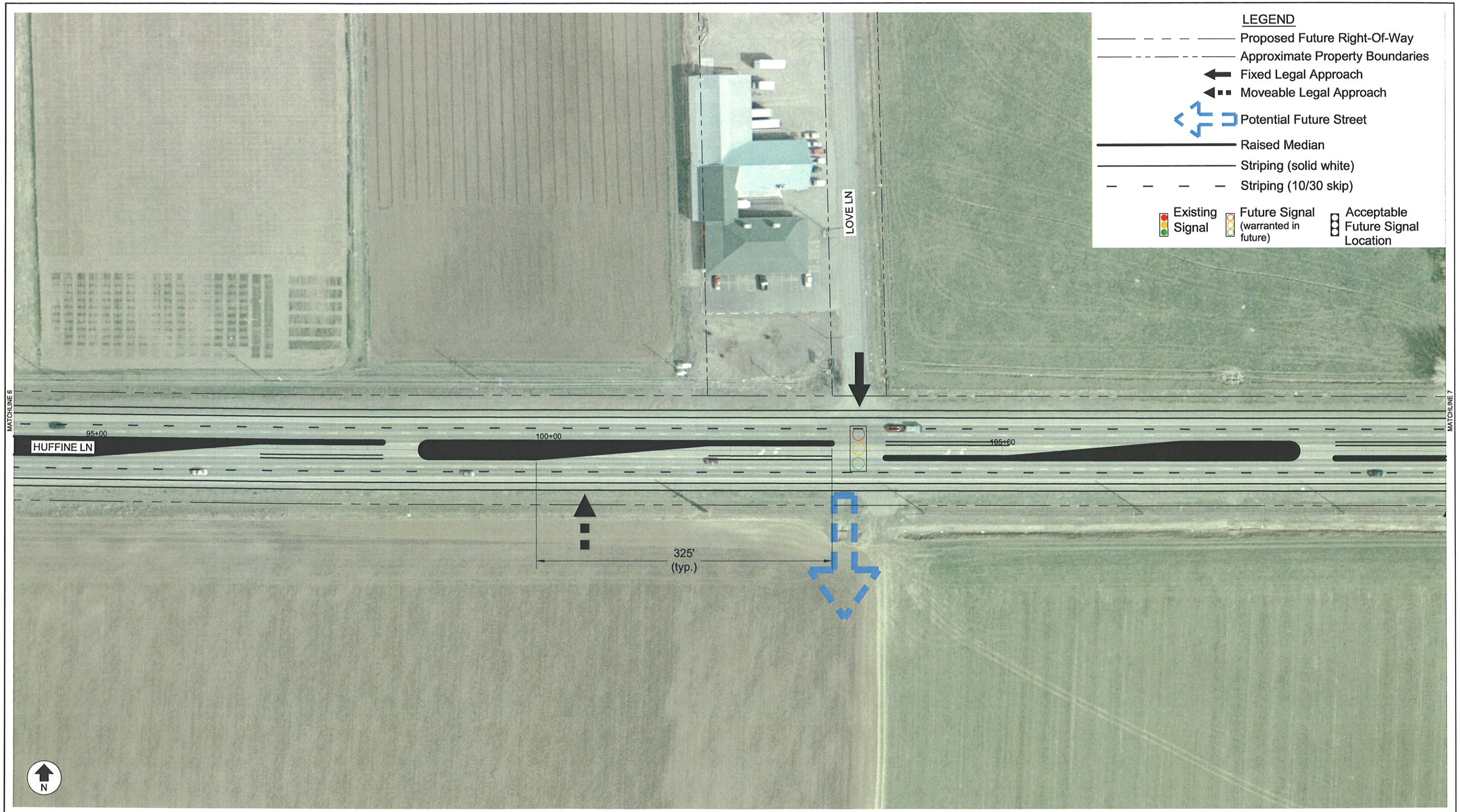
BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 11

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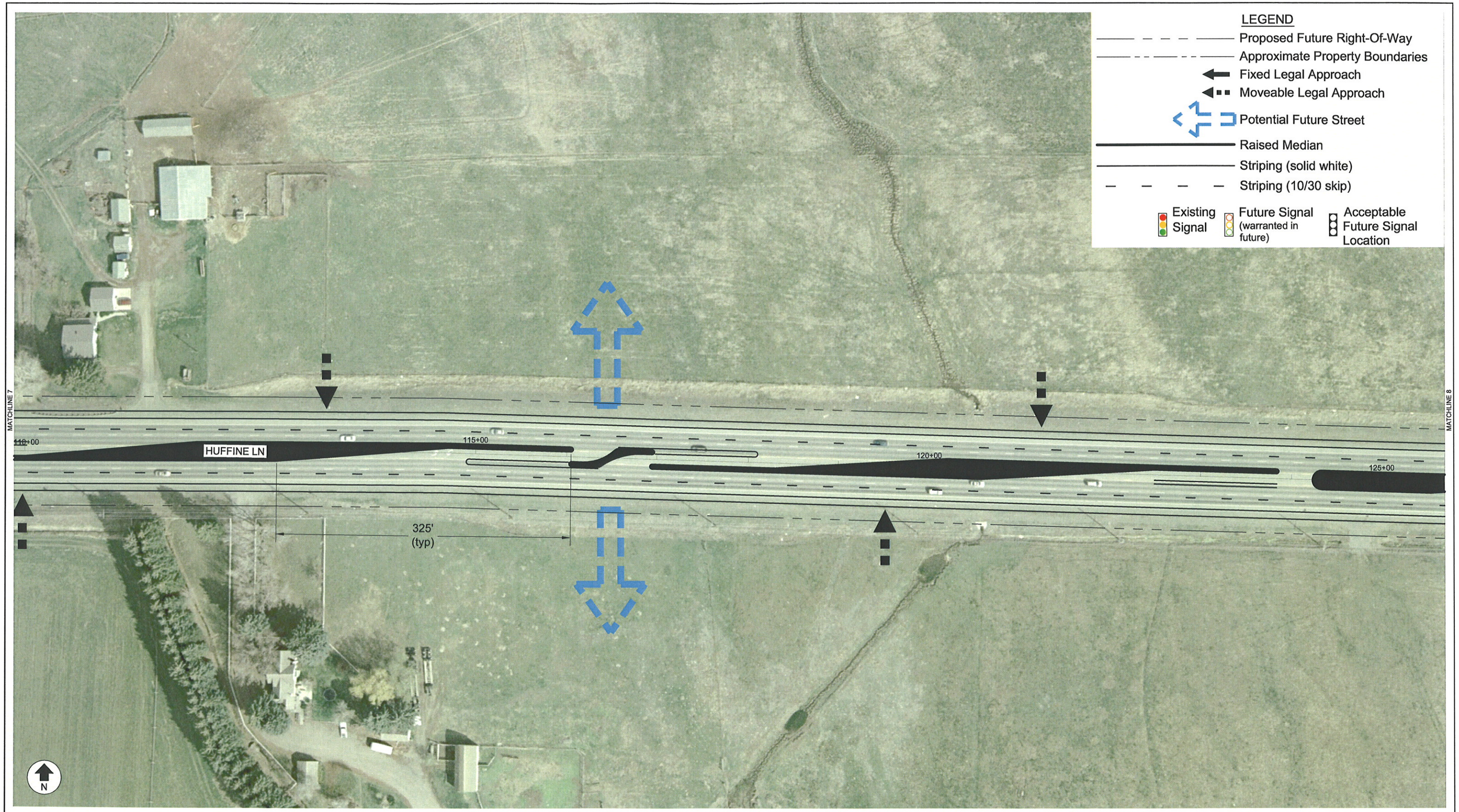
BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 12

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BOZEMAN HUFFINE LANE CORRIDOR STUDY

N

LEGEND

- Proposed Future Right-Of-Way
- Approximate Property Boundaries
- Fixed Legal Approach
- Moveable Legal Approach
- Potential Future Street
- Raised Median
- Striping (solid white)
- Striping (10/30 skip)
- Existing Signal
- Future Signal (warranted in future)
- Acceptable Future Signal Location

HUFFINE LN

135+00

140+00

ROLAND RD

ROLAND RD

MATCHLINE 8

MATCHLINE 9

SCALE IN FEET
0 50' 100'

SEH

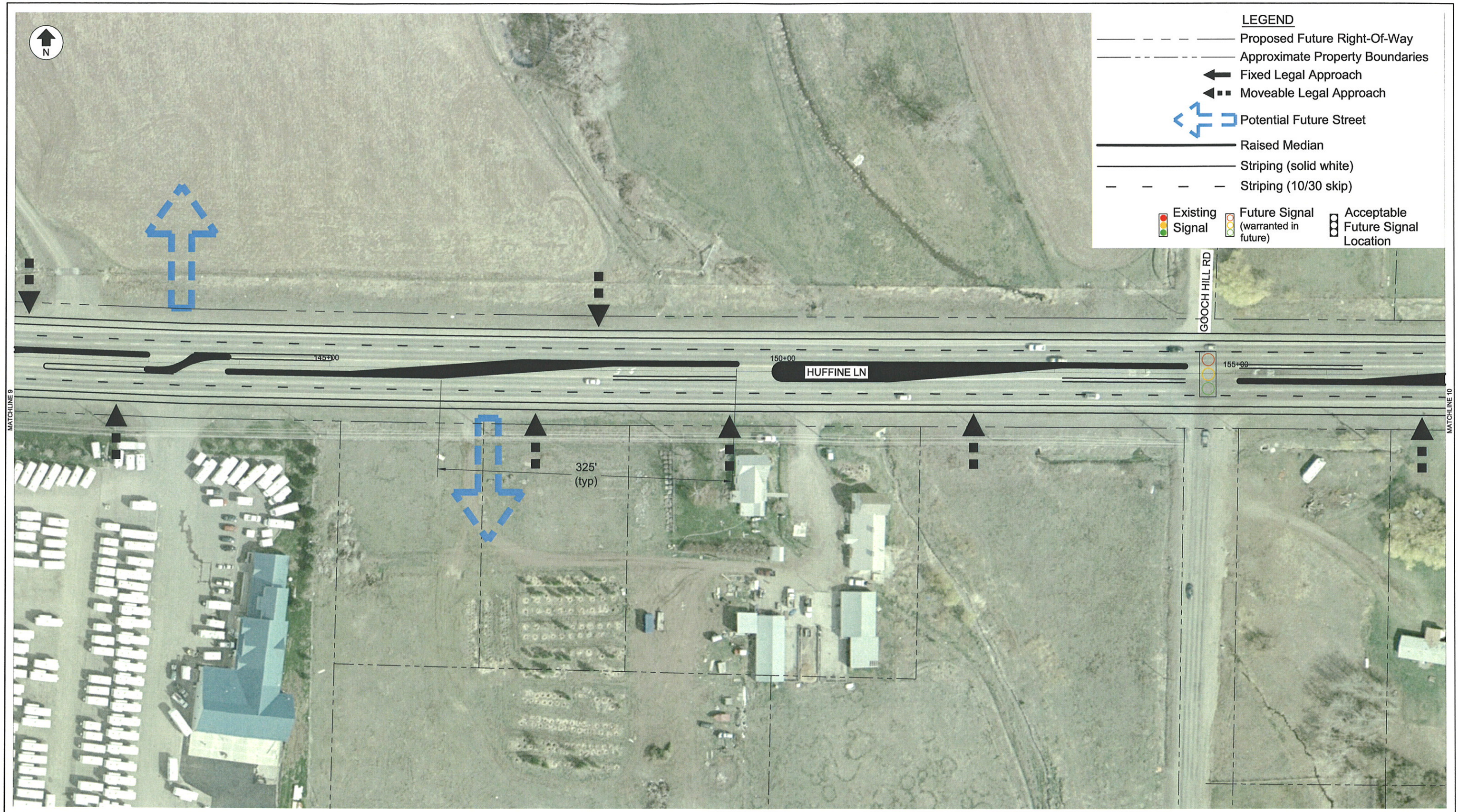
HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 13

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

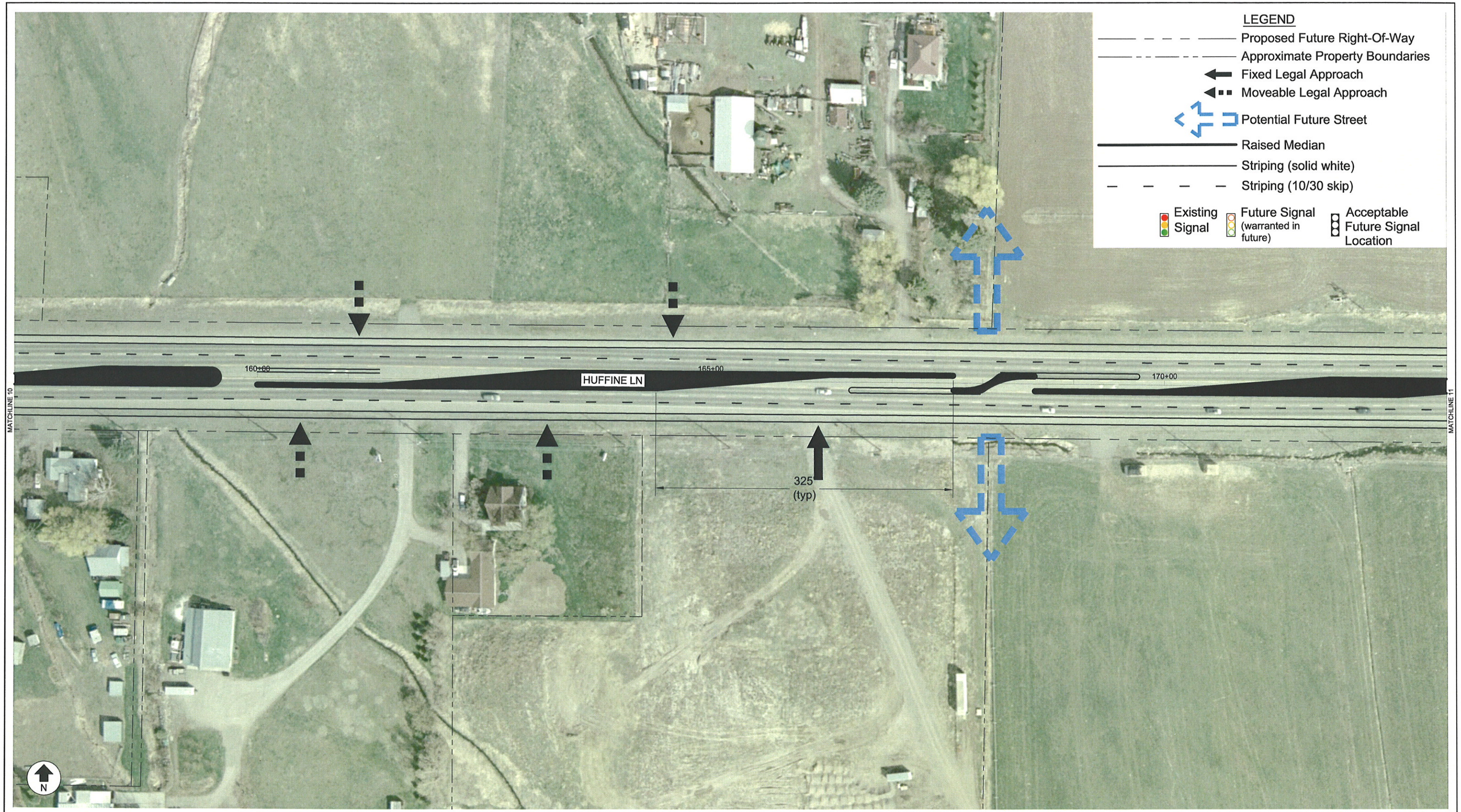
HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 14

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

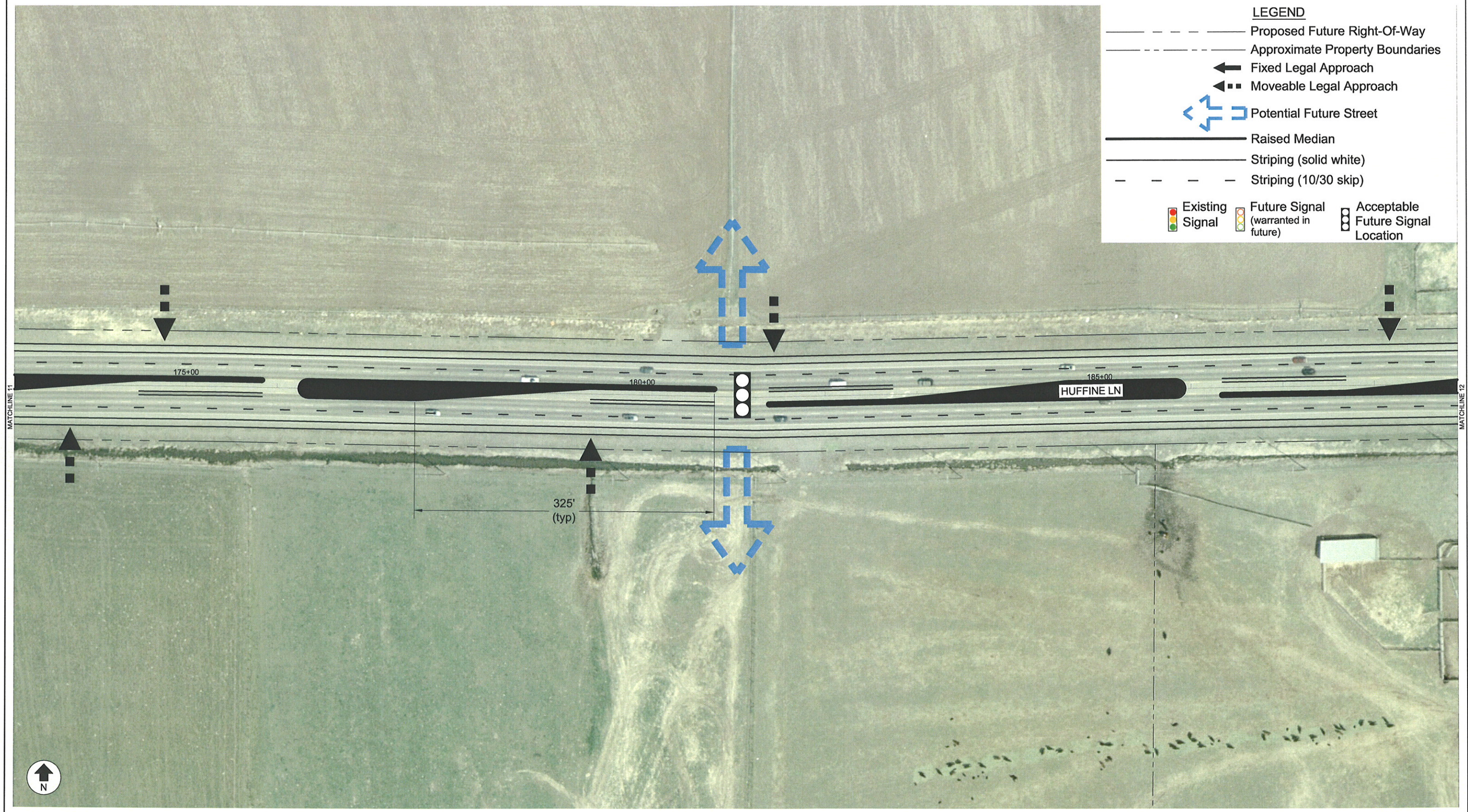
HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 15

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY



SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 16

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 17

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 18

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	Date	Drawn by	Job #	
1"=100' (11X17)	August 2007	RAC	AMTDOT0307	Section 3 Figure 19

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 20

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale 1"=100' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 3 Figure 21

serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

LEGEND

- Proposed Future Right-Of-Way
- Approximate Property Boundaries
- Fixed Legal Approach
- Moveable Legal Approach
- Potential Future Street
- Raised Median
- Striping (solid white)
- Striping (10/30 skip)
- Existing Signal
- Future Signal (warranted in future)
- Acceptable Future Signal Location

End Access Management Plan

325+00

320+00

315+00

HUFFINE LN

325' (typ)

COLLEGE ST.

MATCHLINE 17

N

SCALE IN FEET
0 50' 100'

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

Full Movements (every 1/2 mile) - 3/4 Movements (every 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	Date	Drawn by	Job #	Section 3 Figure 22
1"=100' (11X17)	August 2007	RAC	AMTDOT0307	

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BOZEMAN HUFFINE LANE CORRIDOR STUDY

SECTION 4
HUFFINE LANE CORRIDOR
SPECIFIC ACCESS MANAGEMENT REQUIREMENTS

In order to implement the level of access management required on Huffine Lane to appropriately balance the safety, mobility, and access needs of the corridor, the following specific access management criteria are in force on Huffine Lane between Jackrabbit Lane and College Street in Gallatin County and the City of Bozeman, MT.

Some relevant design criteria from the Montana Department of Transportation Road Design Manual are referenced in several of the paragraphs below, and copies of those pages are included at the end of this section. However, the applicant should confirm and use the latest version of the design manual for planning and design purposes. Applicants should check the Montana Department of Transportation website, at **http://www.mdt.mt.gov/publications/manuals.shtml**, for the latest version of the manual.

1. Number of accesses permitted

Modifications to previously approved accesses will only be considered if the net result of those modifications can be demonstrated - to MDT's satisfaction and based on a thorough technical analysis – that those modifications improve the safety and traffic operations of Huffine Lane. Requesting a change to a previously approved access may, at MDT's discretion, invoke an evaluation of all previously approved access to the parcel in question. In this evaluation, MDT may apply all the concepts of good access management to the parcel, as if no current access existed. Such access management practices include minimizing the number of, or eliminating one or all direct accesses to Huffine Lane if a reasonable alternative access to a local street system currently exists, and enforcing minimum spacing distance standards between adjacent accesses.

Unless otherwise previously agreed to in writing by MDT, no direct access to Huffine Lane shall be approved if other reasonable access can be provided by connections to the adjacent roadway system. The determination of reasonable access to the local street system should include consideration of the street's function, purpose, capacity, and operational and safety considerations. If no such alternative access is available, only one access shall be granted. The only exception to this is if an applicant can demonstrate conclusively - to MDT's sole satisfaction - that safety and operational benefits will ensue if a second access to Huffine Lane is permitted. The burden of proof for this rests on the applicant.

2. Access spacing requirements

The minimum spacing between unsignalized access points is 660 feet. If this spacing is not possible due to parcel size, topographic, or other considerations, the applicant must demonstrate that the location proposed provides the best accommodation given the constraints, and is the best location within those constraints that provides for safety and traffic efficiency on Huffine Lane.

3. Access spacing considerations for accesses in advance of approved U-turn locations or signalized intersections.

If possible, accesses in advance of approved U-turn locations (shown on Figure 2) should be located at least 400 feet in advance of an approved U-turn location, and 550 feet in advance of signalized intersections without U-turns, to prevent unsafe weaving movements.

4. Description of turning movement restrictions

Full turning movements are allowed only at the approved locations shown in Section 3,"Huffine Lane Access Management Plan Details,, approximately one half mile apart. Three quarter turn movements are allowed only at the approved locations shown in Section 3, "Huffine Lane Access Management Plan Details," at approximately quarter mile locations. All other direct access to Huffine Lane must be right in and/or right out only. MDT reserves the right to further restrict three quarter turn intersections to right in/right out if a safety analysis based on a documented safety problem indicates this will eliminate the crash problem.

5. Auxiliary lane requirements

- *Left turn ingress auxiliary lanes will only be allowed at the locations approved for traffic signals or three-quarter turns, or at the east intersection with Arrowhead Trail, as shown in Section 3, "Huffine Lane Access Management Plan Details." At allowable locations, left turn auxiliary lanes shall be designed consistent with Montana Department of Transportation design criteria. Applicable design details can be found later in this section. Figure 28.4K (attached) contains many of the relevant details. Montana Department of Transportation practice for three quarter turn movements is to design for the deceleration length only.*
- *Right turn ingress deceleration lanes shall be sited and designed consistent with Montana Department of Transportation design criteria. Generally, right turn lanes at unsignalized intersections are considered when the thresholds in Figure 28.4B (attached) are met. However, other site specific operational conditions must also be considered, such as capacity, crash history or potential, trucks turning, etc.*

At signalized intersections, both deceleration and storage requirements need to be addressed. Figure 28.4L (attached) and the Highway Capacity Manual queuing analysis is to be used to determine length of storage.

Turn bay development, including taper rates and deceleration lengths are all based on the design speed. For Huffine Lane, the default design speed is 65 mph, unless otherwise determined by the Department.

Right turn egress acceleration lanes are not required on Huffine Lane. The exception to this would be if unusual safety or topographic constraints indicate that a right turn egress acceleration lane would provide safety or traffic operational benefits to Huffine Lane.

6. Access for coordinated parcels

If MDT has previously approved an individual access or access to single parcels that are being coordinated for the purposes of development, the combined parcel will be treated as a single parcel, and access criteria will be applied as if this were a new parcel with no previously approved access.

7. Access for split or divided parcels

Parcels that have previously approved access will receive no new additional access if they are split or divided.

8. Traffic signal requirements

Traffic signals will only be allowed at approved traffic signal locations, shown in the "Huffine Lane Access Management Plan Details" section. MDT will only consider allowing the construction of a traffic signal if at least one of the warrant criteria found in the "Manual of Uniform Traffic Control Devices" is satisfied. If a warrant is satisfied, MDT may require the applicant to provide further documentation demonstrating that a signal is justified based on capacity or safety considerations, now or in the future. The cost to plan, design, and construct any and all traffic signals required to mitigate the impacts of a proposed development or developments to Huffine Lane must be borne by those requesting the development – NOT the Montana Department of Transportation.

9. Sight distance requirements

All access to Huffine Lane shall be designed to provide proper sight distance, per the Montana Department of Transportation design criteria, found the Montana Department of Transportation Design Manual, latest edition. Section 13.4 "Intersection Sight Distance" of the December, 2004 edition of the Montana Design Manual is attached.

10. Corner clearance requirements

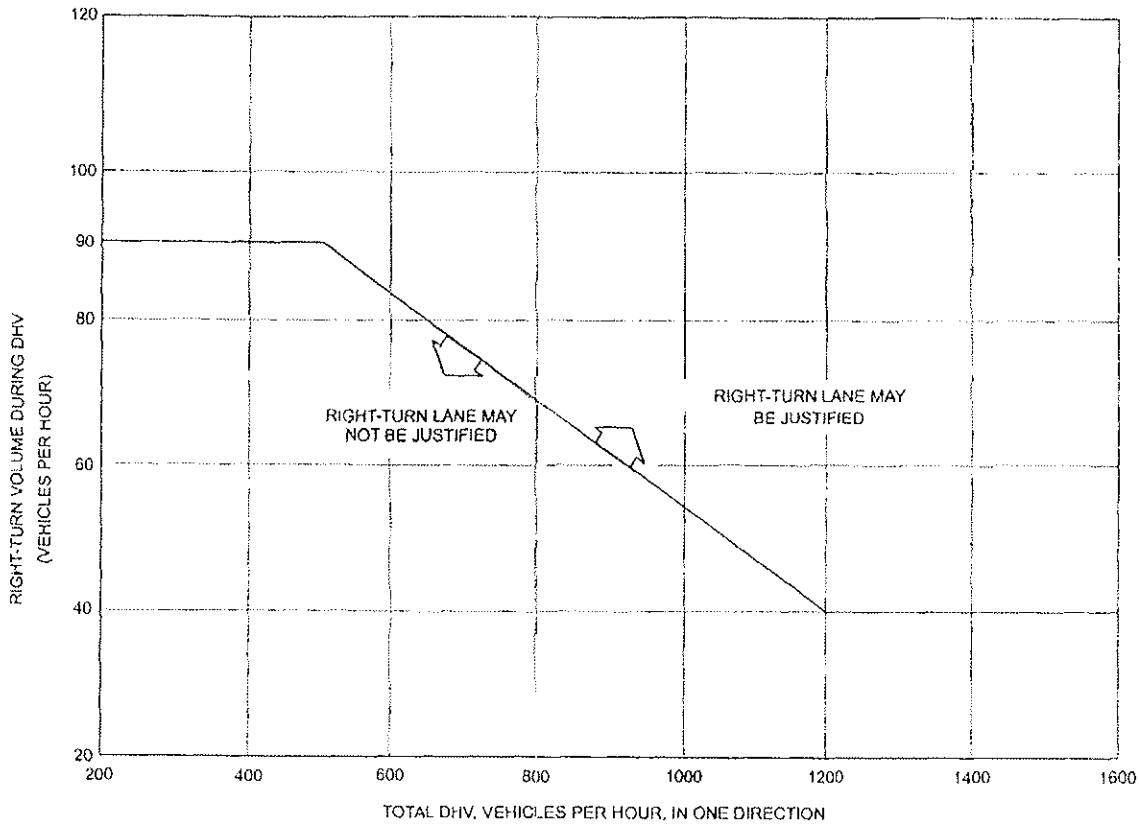
Accesses near or adjacent to public street intersections must be located at least 200 feet away from the intersection (defined by the point of curvature of the nearest curb or radius return). If this is not possible due to property frontage reasons, the access must be located as far from the intersection as possible – generally, within ten feet of the next adjacent property line.

11. Intersecting street requirements

In order to minimize traffic congestion and potential accident problems on north-south public or private streets that intersect Huffine Lane, it is recommended that all streets intersecting these north-south streets shall be at least 300 feet back from the extended flowline of Huffine Lane. It is further recommended that direct parcel access to the north-south street intersecting Huffine Lane shall not be allowed within 300 feet of the extended flowline of Huffine Lane.

12. Permission required for any and all work within the Montana Department of Transportation right-of-way on Huffine Lane.

It is required that permission to perform any and all work within the Montana Department of Transportation right-of-way for Huffine Lane be secured from the Montana Department of Transportation Maintenance Chief PRIOR to the commencement of any such work. The Maintenance Chief can be contacted at 406-556-4700.



Note: Figure is only applicable on highways with a design speed of 50 mph (80 km/h) or greater.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 4-LANE HIGHWAYS

Figure 28.4B

28.4.2 Design of Turn Lanes

28.4.2.1 Widths

The following will apply to auxiliary turn lane widths:

1. Lane Widths. Typically, the width of any turn lanes at an intersection is the same as that of the adjacent through lane. In rare cases, it may be justified to provide a narrower width (e.g., restricted right-of-way).

2. Shoulder. The designer should meet the following for shoulders adjacent to auxiliary lanes:

   a. On uncurbed facilities, the shoulder width adjacent to the auxiliary lane should be the same as the normal shoulder width for the approaching roadway. At a minimum, the width may be 4 ft (1.2 m), assuming the roadway has a shoulder width equal to or greater than 4 ft (1.2 m).

   b. On curbed facilities, the offset between the auxiliary lane and face of curb should be the same as that for the normal roadway section, typically 2 ft (0.6 m). At a minimum, the offset may be 1 ft (0.3 m).

3. Cross Slope. The cross slope for an auxiliary lane will typically be the same as the adjacent through lane, which is typically 2%.

28.4.2.2 Turn Lane Lengths

The length of a right- or left-turn lane at an intersection should allow for both safe vehicular deceleration and storage of turning vehicles. This is the Department's minimum design at rural intersections. However, for urban facilities, it may be impractical to provide a turn lane length that provides for deceleration. Therefore, the full-width, turn-lane length may be designed to only provide sufficient distance for storage at urban intersections. To determine the turn lane length, the designer should consider the following:

1. Taper. For tapers, the following will apply:

   a. Design. A straight-line taper is typically used at the entrance of the turn lane.

   b. NHS Routes. The taper length is in addition to the deceleration distance as described in Comment #2 (i.e., the deceleration is assumed to begin after the taper).

c. Non-NHS Routes. The taper distance is included in the deceleration distance as described in Comment #2; (i.e., deceleration is assumed to begin at the beginning of the taper).

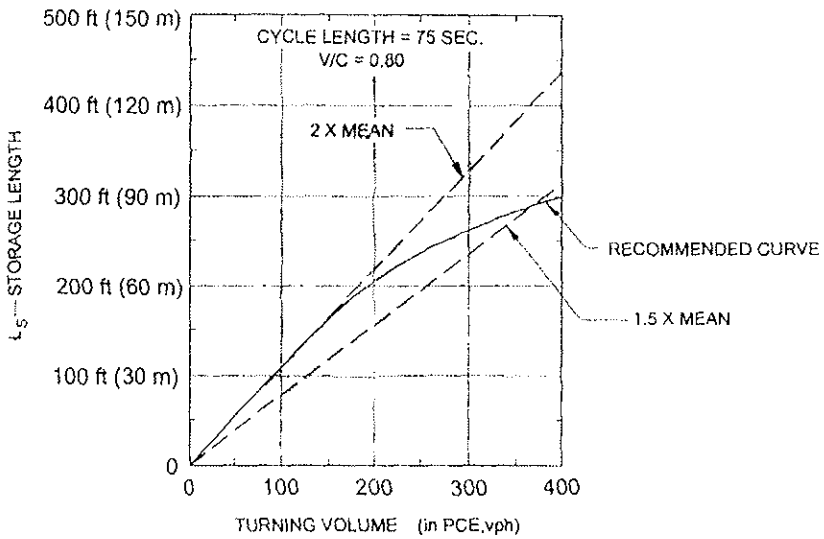
d. Taper Rates. Figure 28.4G provides the recommended taper rates for various design speeds.

2. Deceleration. For rural facilities, the deceleration distance (L_D) should meet the criteria presented in Figure 28.4H. This assumes that the driver will come to a complete stop before turning. For turning roadways, it can be assumed that the driver will be making the right turn at 15 mph (20 km/h). The deceleration distances for 15 mph (20 km/h) are also presented in Figure 28.4H. These distances are desirable on urban facilities; however, this is not always feasible. Under restricted urban conditions and where the design speed is less than or equal to 45 mph (70 km/h), deceleration may have to be accomplished entirely within the travel lane. For these cases, the length of turn lane will be determined solely on the basis of providing adequate vehicular storage (i.e., L_D = 0.0 ft (0.0 m)).

3. Storage. The storage length (L_S) for turn lanes should be sufficient to store the number of vehicles likely to accumulate. The designer should consider the following in determining the recommended storage length:

a. Signalized Intersections. Figure 28.4I illustrates the method to determine the recommended storage length for left-turn lanes, or right-turn lanes where right-turn-on-red is prohibited at a signalized intersection. The values obtained from the figure are for a cycle length of 75 seconds and a volume/capacity (*v/c*) ratio of 0.80. For other values, the designer should multiply the length obtained in the figure by an adjustment factor found in the accompanying table with Figure 28.4I. The *v/c* ratio is determined by a capacity analysis as described in the Highway Capacity Manual. The designer should also ensure at signalized intersections that the right- and left-turn lane lengths exceed the storage length of the adjacent through lane. Otherwise, a vehicular queue in the through lane will block entry into the turn lane for turning vehicles. Most capacity software packages have a queuing model available. Use engineering judgment to determine the appropriate method to use to determine storage requirements.

b. Unsignalized Intersections. The minimum storage length should be sufficient to accommodate the expected number of turning vehicles likely to arrive in an average 2 minute period within the design hour. The



Storage Length Adjustment Factors

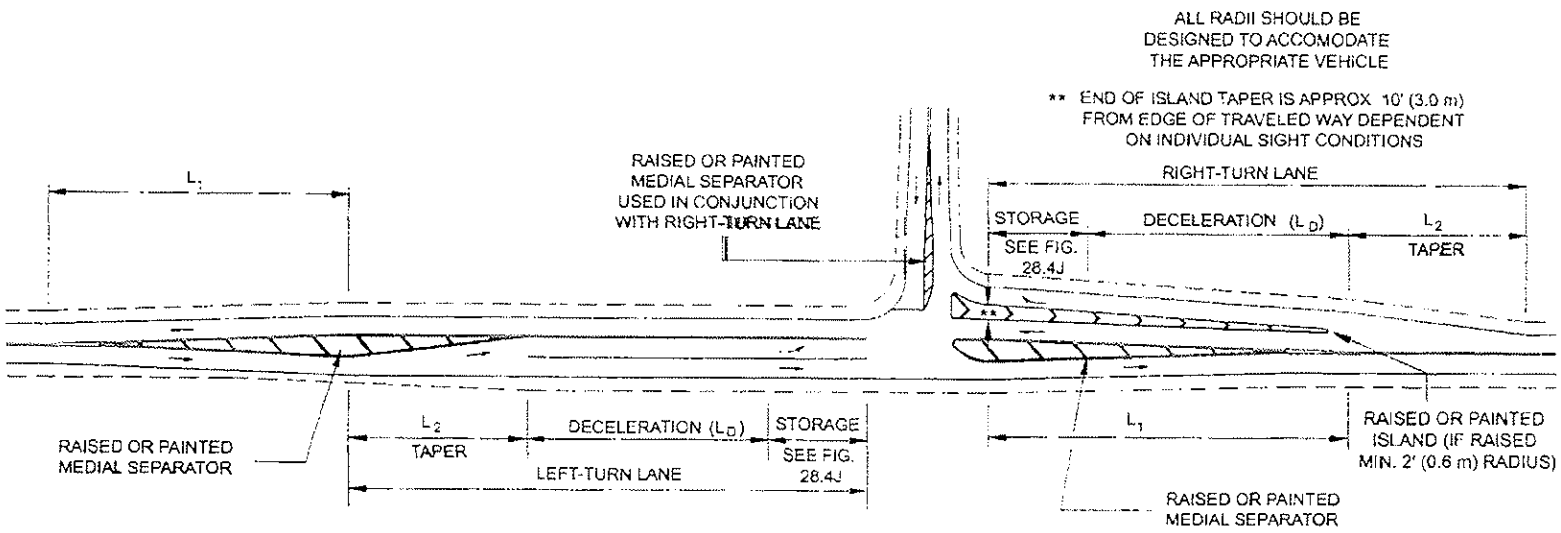
v/c RATIO, X	CYCLE LENGTH, C (SEC)				
	60	70	80	90	100
0.50	0.70	0.76	0.84	0.89	0.94
0.55	0.71	0.77	0.85	0.90	0.95
0.60	0.73	0.79	0.87	0.92	0.97
0.65	0.75	0.81	0.89	0.94	1.00
0.70	0.77	0.84	0.92	0.98	1.03
0.75	0.82	0.88	0.98	1.03	1.09
0.80	0.88	0.95	1.05	1.11	1.17
0.85	0.99	1.06	1.18	1.24	1.31
0.90	1.17	1.26	1.40	1.48	1.56
0.95	1.61	1.74	1.92	2.03	2.14

Notes:

1. *Figure applies to exclusive left-turn lanes and exclusive right-turn lanes where right-turns-on-red are not allowed.*
2. *See minimum storage length discussion in Section 28.4.2.2.*
3. *To determine the v/c ratio and the passenger car equivalent (PCE) values, see the Highway Capacity Manual.*
4. *If turning volumes exceed 300 vph, consider providing dual-turn lanes.*

RECOMMENDED STORAGE LENGTH FOR SIGNALIZED INTERSECTIONS

Figure 28.4I



Design Speed (mph)	Taper Rate	
	Lane Shifts (L_1)	Auxiliary Lanes (L_2)
20	10:1	8:1
25	15:1	8:1
30	20:1	8:1
35	25:1	10:1
40	40:1	10:1
45	45:1	10:1
50	50:1	15:1
55	55:1	18:1
60	60:1	18:1
65	65:1	18:1
70	70:1	18:1
75	75:1	18:1

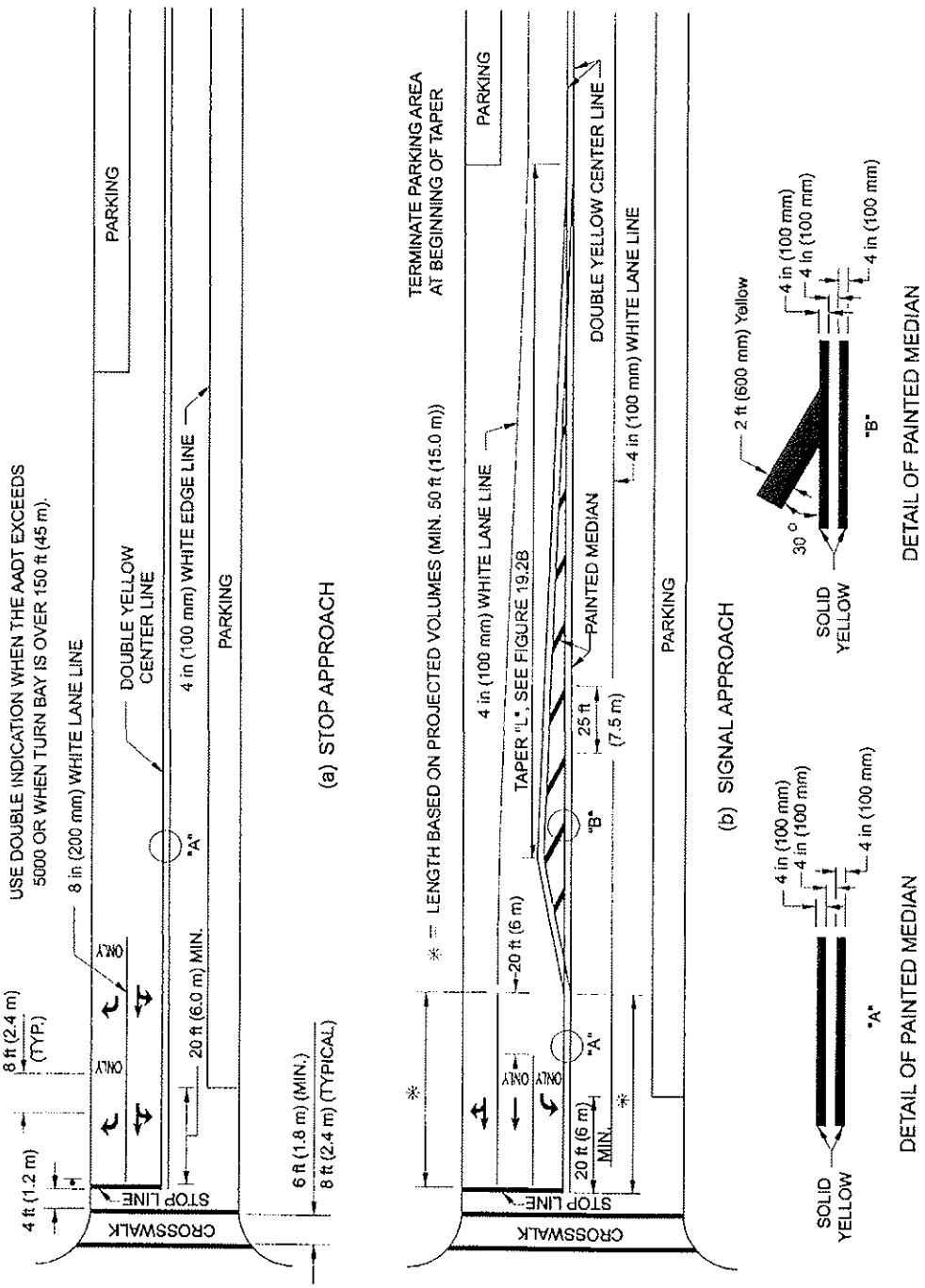
Taper Length (L) = Taper Rate x Offset Distance
See Section 28.4.2.2 for minimum left-turn lane lengths.

Design Speed (mph)	Average Running Speed (mph)(1)	L_D(ft)(2)	
		Stop Condition	15 mph
25	25	200	185
30	28	235	200
35	32	280	250
40	36	320	295
45	40	385	350
50	45	435	405
55	48	480	455
60	52	530	500
65	55	570	540
70	58	615	590

(1) Average running speeds assumed for calculations.
(2) Bay taper may be included in the deceleration length on non-NHS projects.

CHANNELIZED TURN LANES FOR 2-LANE FACILITIES
(US Customary)

Figure 28.4K



TYPICAL INTERSECTION LANE-USE CONTROL MARKINGS

Figure 19.4D

13.4 INTERSECTION SIGHT DISTANCE

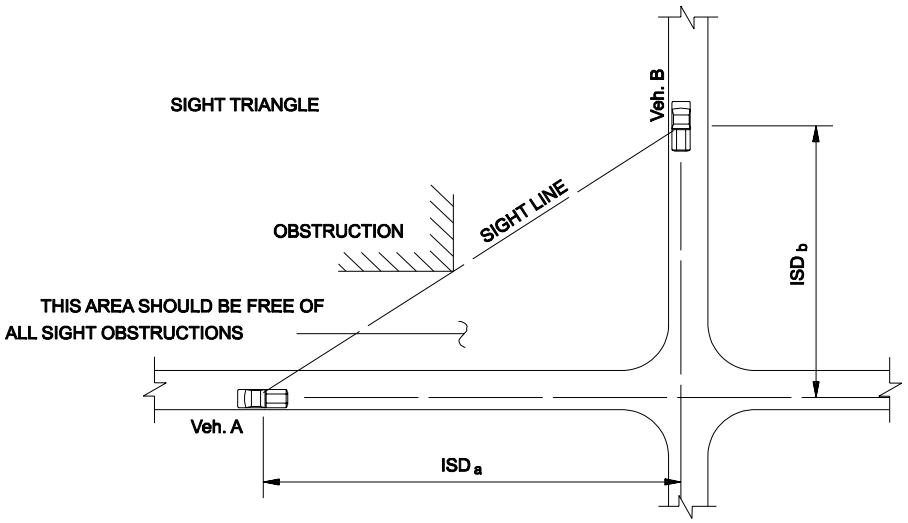
For an at-grade intersection to operate properly, adequate sight distance should be available. The designer should provide sufficient sight distance for a driver to perceive potential conflicts and to perform the actions needed to negotiate the intersection safely. The additional costs and impacts of removing sight obstructions are often justified. If it is impractical to remove an obstruction blocking the sight distance, the designer should consider providing traffic control devices or design applications (e.g., warning signs, turn lanes) which may not otherwise be considered.

In general, ISD refers to the corner sight distance available in intersection quadrants which allows a driver approaching an intersection to observe the actions of vehicles on the crossing leg(s). ISD evaluations involve establishing the needed sight triangle in each quadrant by determining the legs of the triangle on the two crossing roadways. The necessary clear sight triangle is based on the type of traffic control at the intersection and on the design speeds of the two roadways.

The Department uses gap acceptance as its basic concept in the design of intersection sight distance. This gap acceptance design is based on the criteria and theory presented in NCHRP Report 383, *Intersection Sight Distance*.

13.4.1 No Traffic Control

Intersections between low-volume and low-speed roads/streets may have no traffic control. At these intersections, sufficient corner sight distance should be available to allow approaching vehicles to adjust their speed to avoid a collision, typically 50 percent of their mid-block running speed. Figure 13.4A provides the ISD criteria for intersections with no traffic control. For approach grades greater than 3%, adjust the ISD values obtained in Figure 13.4A with the applicable ratios in Figure 13.4B.



Design Speed (mph)	15	20	25	30	35	40	45	50
*Intersection Sight Distance (ft)	70	90	115	140	165	195	220	245
Design Speed (km/h)	20	30	40	50	60	70	80	90
*Intersection Sight Distance (m)	20	25	35	45	55	65	75	90

Note: For approach grades greater than 3%, multiply the sight distance values in this table by the appropriate adjustment factor from Figure 13.4B. The grade adjustment is based on the approach roadway grade only.

Example

Given: No traffic control at intersection

	U.S. Customary	Metric
Design speed	35 mph (Highway A)	60 km/h (Highway A)
	25 mph (Highway B)	40 km/h (Highway B)

Problem: Determine legs of sight triangle.

Solution: From above table ---ISD_a = 165' ISD_a = 55 m

ISD_b = 115' ISD_b = 35 m

Note: This figure is not applicable for State highways.

INTERSECTION SIGHT DISTANCE
(No Traffic Control)
Figure 13.4A

U.S. Customary

Approach Grade (%)	Design Speed (mph)										
	20	25	30	35	40	45	50	55	60	65	70
-6	1.1	1.1	1.1	1.1	1.1.	1.1	1.2	1.2	1.2	1.2	1.2
-5	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2
-4	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-3 to +3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+4	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+5	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+6	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Metric

Approach Grade (%)	Design Speed (km/h)									
	30	40	50	60	70	80	90	100	110	120
-6	1.1	1.1	1.1	1.1	1.1.	1.2	1.2	1.2	1.2	1.2
-5	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2
-4	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-3 to +3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+4	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+5	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+6	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Note: Based on ratio of stopping sight distance on specified approach grade to stopping sight distance on level terrain. The grade adjustment is based on the approach roadway grade only.

ADJUSTMENT FACTORS FOR APPROACH SIGHT DISTANCE BASED ON APPROACH GRADE

Figure 13.4B

13.4.2 Stop Controlled/Traffic-Signal Controlled

Where traffic on the minor road of an intersection is controlled by stop signs, the driver of the vehicle on the minor road must have sufficient sight distance for a safe departure from the stopped position assuming that the approaching vehicle comes into view as the stopped vehicle begins its departure.

The stopped-controlled criteria required will also apply to a signalized intersection. This is reasonable because of the increased driver work load at intersections and the potential conflicts involved when vehicles turn onto or cross the highway. These include:

1. violation of the signal,
2. right-turns-on-red,
3. signal malfunction, and/or
4. use of flashing yellow/red mode during part of the day.

If these criteria cannot be met, give consideration to prohibiting right-turn-on-red at the intersection or prohibiting the flashing mode. This determination will be based on field investigations and will be determined on a case-by-case basis.

13.4.2.1 Basic Criteria

The Department uses gap acceptance as the conceptual basis for its intersection sight distance (ISD) criteria at stop-controlled and traffic-signal controlled intersections. The intersection sight distance is obtained by providing clear sight triangles both to the right and left as shown in Figure 13.4C. The length of legs of these sight triangles are determined as follows:

1. Minor Road. The length of leg along the minor road is based on two parts. The first is the location of the driver's eye on the minor road. This is typically assumed to be 14.4' (4.4 m) from the edge of traveled way for the major road and in the center of the lane on the minor road; see Figure 13.4C. The second part is based on the distance to the center of the vehicle on the major road. For right-turning vehicles, this is assumed to be the center of the closest travel lane from the left. For left-turning vehicles, this is assumed to be the center of the closest travel lane for vehicles approaching from the right; see Figure 13.4C.

2. Major Road. The length of the sight triangle leg or ISD along the major road is determined using the following equation:

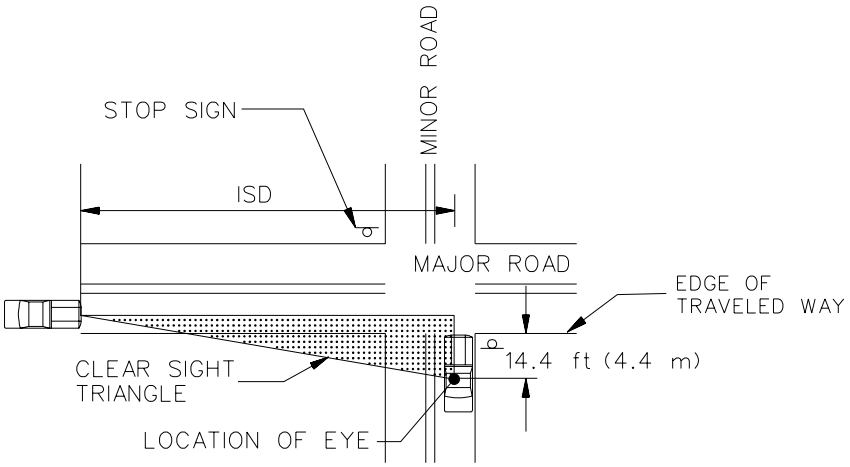
U.S. Customary *Metric*

$ISD = 1.47\ V_{major}\ t_g$ $ISD = 0.278\ V_{major}\ t_g$ (Equation 13.4-1)

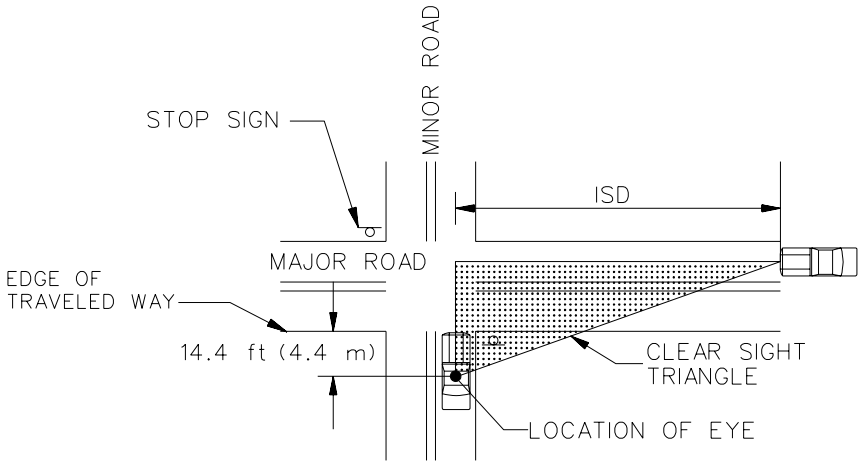
Where:

ISD = length of sight triangle leg along major road [ft (m)]
V_{major} = design speed of major road [mph (km/h)]
t_g = gap acceptance time for entering the major road (sec)

The gap acceptance time (t_g) varies according to the design vehicle, the grade on the minor road approach, the number of lanes on the major roadway, the type of operation and the intersection skew. Section 13.4.2.4 presents several examples on the application of ISD.



CLEAR SIGHT TRIANGLE FOR VIEWING
TRAFFIC APPROACHING FROM THE LEFT



CLEAR SIGHT TRIANGLE FOR VIEWING
TRAFFIC APPROACHING FROM THE RIGHT

CLEAR SIGHT TRIANGLES (STOP-CONTROLLED) INTERSECTIONS

Figure 13.4C

Within this clear sight triangle, if practical, the objective is to remove, lower any object or trim lower branches that obstructs the driver's view. These objects may include buildings, parked or turning vehicles, trees, hedges, tall crops, un-mowed grass, fences, retaining walls and the existing ground line. In addition, where an interchange ramp intersects the major road or crossroad near a bridge on a crest vertical curve, objects such as bridge parapets, piers, abutments or the crest vertical curve itself may restrict the clear sight triangle.

13.4.2.2 Vehicle Entering Major Roadway

To determine the intersection sight distance for vehicles turning left or right onto the major road, the designer should use Equation 13.4-1 and the gap acceptance time (t_g) presented in Figure 13.4D. Figure 13.4E, which solves Equation 13.4-1, provides the ISD values for all design vehicles on 2-lane, level facilities. The designer should also consider the following:

1. Turn Maneuver. There is only a minimal difference in the gap acceptance times between the left- and right-turning drivers. Therefore, only one gap acceptance time is provided.

2. Multilane Facilities. For multilane facilities, the gap acceptance times presented in Figure 13.4D should be adjusted to account for the additional distance required by the turning vehicle to cross the additional lanes or median. The following will apply:

    a. Left-Turns. For left turns onto multilane highways, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane, in excess of one, to be crossed by the turning vehicle. Assume that the left-turning driver will enter the left travel lane on the far side of the major road. For example, the gap acceptance time for a passenger car turning left onto an undivided six-lane facility would be 7.5 seconds plus 0.5 seconds for each of the two additional lanes needed to be crossed. The total gap time required is therefore 8.5 seconds.

    b. Right Turns. Because the turning vehicle is assumed to be turning into the nearest right through lane, no adjustments to the gap times are required.

3. Medians. For a multilane facility which does not have a median wide enough to store a stopped vehicle, divide the median width by 12' (3.6 m) to determine the corresponding number of lanes, and then use the criteria in Comment #2a above to determine the appropriate time factor.

On multilane facilities with a median wide enough to store the stopped vehicle, the designer should evaluate the move in two steps; see Figure 13.4F:

a. First, with the vehicle stopped on the minor road (the bottom portion in Figure 13.4F), use the gap acceptance times and distances for a vehicle turning right (Figures 13.4D and 13.4E) to determine the applicable ISD. Under some circumstances, it may be necessary to check the crossing maneuver to determine if it is the critical movement. Crossing criteria are discussed in Section 13.4.2.3.

b. Then, with the vehicle stopped in the median (top portion in Figure 13.4F), assume a two-lane roadway design and use the gap acceptance times and distances for vehicles turning left (Figures 13.4D and 13.4E) to determine the applicable ISD.

4. Approach Grades. If the approach grade on the minor road exceeds +3%, add the following times to the basic gap acceptance times in Figure 13.4D:

a. Left Turns. Multiply the percent grade on the approach by 0.2 and add this to the base time gap.

b. Right Turns. Multiply the percent grade on the approach by 0.1 and add this to the base time gap. Use the adjusted t_g in Equation 13.4-1 to determine the applicable ISD. Do not apply the grade adjustment if the approach grade is negative.

Design Vehicle	Gap Acceptance Time (t_g) (sec)
Passenger Car	7.5
Single-Unit Truck	9.5
Tractor/Semitrailer	11.5

GAP ACCEPTANCE TIMES
(Right or Left Turn From Minor Road)

Figure 13.4D

U.S. Customary(Rounded for Design)

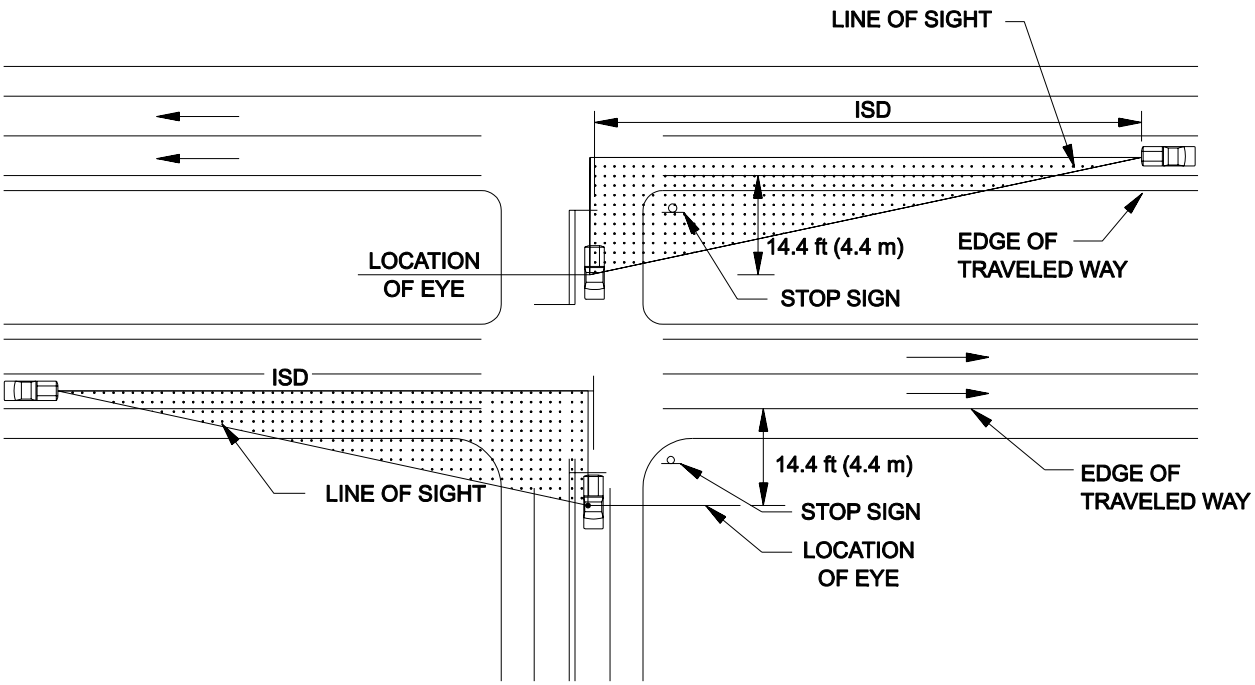
Design Speed (V_{major}) (mph)	ISD (ft)		
	Passenger Cars	Single-Unit Trucks	Tractor/Semitrailers
20	225	280	340
25	280	350	425
30	335	420	510
35	390	490	595
40	445	560	680
45	500	630	765
50	555	700	850
55	610	770	930
60	665	840	1015
65	720	910	1100
70	775	980	1185

Metric(Rounded for Design)

Design Speed (V_{major}) (km/h)	ISD (m)		
	Passenger Cars	Single-Unit Trucks	Tractor/Semitrailers
30	65	80	100
40	85	110	130
50	105	135	160
60	130	160	195
70	150	185	225
80	170	215	260
90	190	240	290
100	210	265	320
110	230	295	355

Note: These ISD values assume a minor road approach grade $\leq$ +3%.

TWO-LANE INTERSECTION SIGHT DISTANCES
(Right or Left Turn from Minor Road)
Figure 13.4E



INTERSECTION SIGHT DISTANCE
(Divided Facilities) Figure 13.4F

5. Trucks. At some intersections (e.g., near truck stops, interchange ramps, grain elevators), the designer may want to use the truck as the design vehicle for determining the ISD. The gap acceptance times (t_g) for single-unit and tractor/ semitrailer trucks are provided in Figure 13.4D. ISD values for level, 2-lane roadways are presented in Figure 13.4E.

6. Height of Eye/Object. The height of eye for passenger cars is assumed to be 3.5' (1080 mm) above the surface of the minor road. The height of object (approaching vehicle on the major road) is also assumed to be 3.5' (1080 mm). An object height of 3.5' (1080 mm) assumes that a sufficient portion of the oncoming vehicle must be visible to identify it as an object of concern by the minor road driver. If there is a sufficient number of trucks to warrant their consideration, assume an eye height of 7.9' (2.4 m) for a tractor/semitrailer and 5.9' (1.8 m) for single-unit trucks and buses. If a truck is the assumed entering vehicle, the object height will still be 3.5' (1080 mm) for the passenger car on the major road.

7. Skew. At skewed intersections where the intersection angle is less than 60°, adjustments may need to be made to account for the extra distance the vehicle needs to travel across opposing lanes. Using the procedures discussed in Comment #2 in Section 13.4.2.2 and/or Section 13.4.2.3, determine the appropriate ISD value based on this extra travel distance.

8. Examples. For examples on the application of ISD, see Section 13.4.2.4.

13.4.2.3 Straight Through Crossing Vehicle

In the majority of cases, the intersection sight distance for turning vehicles typically will provide adequate sight distance to allow a vehicle to cross the major road. However, in the following situations, the crossing sight distance may be the more critical movement:

1. where left and/or right turns are not permitted from a specific approach and the crossing maneuver is the only legal or expected movement (e.g., indirect left turns);

2. where the design vehicle must cross more than six travel lanes or, with medians, the equivalent distance; or

3. where a substantial volume of heavy vehicles cross the highway and there are steep grades on the minor road approach.

Use Equation 13.4-1 and the gap acceptance times (t_g) and the adjustment factors in Figure 13.4G to determine the ISD for crossing maneuvers. Where medians are present, include the median width in the overall length to determine the applicable gap time. Divide this width by 12' (3.6 m) to determine the corresponding number of lanes for the crossing maneuver.

Design Vehicle	Gap Acceptance Time (t_g) (sec)
Passenger Car	6.5
Single-Unit Truck	8.5
Tractor/Semitrailer	10.5

Adjustments:

1. *Multilane Highway. Where the design vehicle is crossing a major road with more than two lanes, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane in excess of two. See the discussion in Section 13.4.2.2 for additional guidance.*

2. *Approach Grade. If the approach grade on the minor road exceeds +3%, multiply the percent grade of the minor road approach by 0.2 and add it to the base gap acceptance time.*

GAP ACCEPTANCE TIMES
(Crossing Maneuvers)

Figure 13.4G

13.4.2.4 Examples of ISD Applications

The following three examples illustrate the application of the ISD criteria:

Example 13-1

Given: Minor road intersects a 4-lane highway with a TWLTL.
Minor road is stop controlled.
Design speed of the major highway is 50 mph (80 km/h).
All travel lane widths are 12' (3.6 m).
The TWLTL width is 14' (4.2 m).
Trucks are not a concern.

Problem: Determine the intersection sight distance to the left and right from the minor road.

Solution: The following steps will apply:

1. For the vehicle turning right, the ISD to the left can be determined directly from Figure 13.4E. For the 50 mph design speed, the ISD to the left is 555'. For the 80 km/h design speed, the ISD to the left is 170 m.

2. For the vehicle turning left, the ISD must reflect the additional time required to cross the additional lanes; see Comment #2 in Section 13.4.2.2. The following will apply:

   a. First, determine the extra width required by the one additional travel lane and the TWLTL and divide this number by 12' (3.6 m):

   U.S. Customary

   $$\frac{(12+14)}{12} = 2.2 \text{ lanes}$$

   Metric

   $$\frac{(3.6+4.2)}{3.6} = 2.2 \text{ lanes}$$

   b. Next, multiply the number of lanes by 0.5 seconds to determine the additional time required:

   (2.2 lanes)(0.5 sec/lane) = 1.1 seconds

   c. Add the additional time to the basic gap time of 7.5 seconds and insert this value into Equation 13.4-1:

U.S. Customary ISD = (1.47)(50)(7.5 + 1.1) = 632’

Metric ISD = (0.278)(80)(7.5 + 1.1) = 191 m

Provide an ISD of 630’ (190 m) to the right for the left-turning vehicle.

3. Check the crossing vehicle, as discussed in Section 13.4.2.3. The following will apply:

   a. First determine the extra width required by the two additional travel lanes and the TWLTL and divide this number by 12’ (3.6 m):

   U.S. Customary

   $$\frac{(12+12+14)}{12} = 3.2 \text{ lanes}$$

   Metric

   $$\frac{(3.6+3.6+4.2)}{3.6} = 3.2 \text{ lanes}$$

   b. Next, multiply the number of lanes by 0.5 seconds to determine the additional time required:

   (3.2 lanes)(0.5 sec/lane) = 1.6 seconds

   c. Add the additional time to the basic gap time of 6.5 seconds and insert this value into Equation 13.4-1:

   U.S. Customary ISD = (1.47)(50)(6.5 + 1.6) = 595’

   Metric ISD = (0.278)(80)(6.5 + 1.6) = 180 m

   The 595’ (180 m) for the crossing maneuver is less than the 630’ (190 m) required for the left-turning vehicle and, therefore, is not the critical maneuver.

Example 13-2

Given: Minor road intersects a 4-lane divided highway.
Minor road is stop controlled.
Design speed of the major highway is 55 mph (90 km/h).
All travel lane widths are 12’ (3.6 m).
The median width is 100’ (30.8 m).
Trucks are not a concern.

Problem: Determine the intersection sight distance to the left and right from the minor road.

Solution: The following steps apply:

1. For the vehicle turning right, the ISD to the left can be determined directly from Figure 13.4E. For the 55 mph design speed, the ISD to the left is 610'. For the 90 km/h design speed, the ISD to the left is 190 m.

2. Determine if the crossing maneuver is critical; see Section 13.4.2.3. No adjustments are required to the base time of 6.5 seconds. Therefore, use Equation 13.4-1 directly:

   U.S. Customary ISD = (1.47)(55)(6.5) = 525'

   Metric ISD = (0.278)(90)(6.5) = 163 m

   The crossing maneuver is less than the right-turning maneuver and, therefore, is not critical.

3. For the vehicle turning left, assume the passenger car is stopped in the median; see Figure 13.4F. The ISD to the right can be determined directly from Figure 13.4E. For the 55 mph design speed, the ISD to the left is 610'. For the 90 km/h design speed, the ISD to the left is 190 m. . The crossing maneuver will not be critical.

Example 13-3

Given: Minor road intersects a 2-lane highway.
Minor road is stop controlled.
Design speed of the major highway is 55 mph (90 km/h).
All travel lane widths are 12' (3.6 m).
The approach grade on the minor road is 4.5%.
Tractor/semitrailer trucks are a concern.

Problem: Determine the intersection sight distance to the left and right from the minor road.

Solution: The following steps will apply:

1. For the left-turning vehicle, the base gap acceptance time from Figure 13.4D is 11.5 seconds. Add the additional time due to the approach grade (0.2 seconds per percent grade) to the base gap time; see Comment #4 in Section 13.4.2.2:

(0.2)(4.5) + 11.5 = 12.4 seconds

Then, using Equation 13.4-1:

U.S. Customary ISD = (1.47)(55)(12.4) = 1003'

Metric ISD = (0.278)(90)(12.4) = 310 m

The ISD for the right-turning vehicle is determined similarly:

(0.1)(4.5) + 11.5 = 12 seconds

Then, using Equation 13.4-1:

U.S. Customary ISD = (1.47)(55)(12.0) = 970'

Metric ISD = (0.278)(90)(12.0) = 300 m

The crossing maneuver will not be critical.

13.4.3 Yield Control

At intersections controlled by a yield sign, drivers on the minor road will typically:

1. slow down as they approach the major road, typically to 60 percent of the approach speed;

2. based on their view of the major road, make a stop/continue decision; and

3. either brake to a stop or continue their crossing or turning maneuver onto the major road.

Yield control criteria is based on a combination of the no control ISD discussed in Section 13.4.1 and the stop-controlled ISD as discussed in Section 13.4.2. To determine the applicable clear sight triangles of the approaches, the following will apply; see Figure 13.4H:

1. Crossing Maneuver. Use the following to determine the legs of the clear sight triangle; Illustration a in Figure 13.4H:

    a. Minor Road. The leg on the minor road approach can be determined directly from Figure 13.4I.

b. Major Road. The leg on the major road is determined using the following equations and the times listed in Figure 13.4I:

U.S. Customary	Metric
$t_g = t_a + \frac{w + L_a}{0.88(V_{\text{minor}})}$	$t_g = t_a + \frac{w + L_a}{0.167(V_{\text{minor}})}$
$b = (1.47)(V_{major})(t_g)$	$b = (0.278)(V_{major})(t_g)$

Where:

b = length of leg of sight triangle along the major road ft (m)

t_g = travel time to reach and clear the major road in a crossing maneuver (sec)

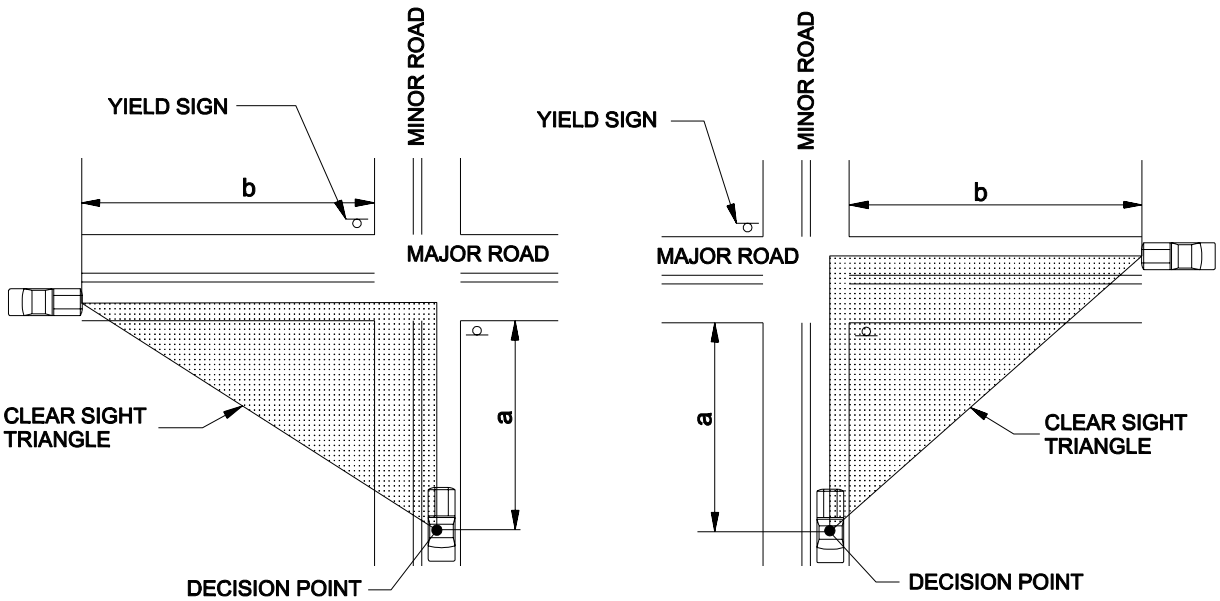
t_a = travel time to reach the major road from the decision point for a vehicle that does not stop(sec) (use appropriate value for the minor-road design speed from Figure 13.4I, adjusted for approach grade, where appropriate)

w = width of intersection to be crossed ft (m)

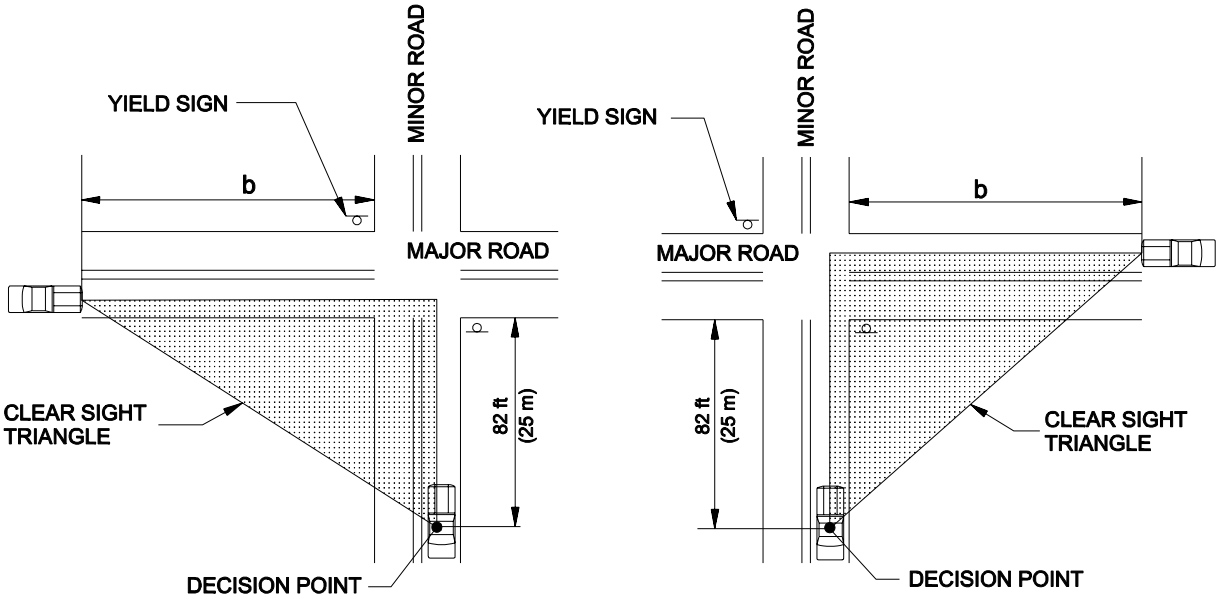
L_a = length of design vehicle ft (m)

V_{minor} = design speed of minor road mph (km/h)

V_{major} = design speed of major road mph (km/h)



a) CROSSING MANEUVERS



b) TURNING MANEUVERS

INTERSECTION SIGHT DISTANCE APPLICATION
(Yield Control)

Figure 13.4H

U.S. Customary

Design Speed (mph)	Approach Distance Along Minor Road[(1)] (a)(ft)	Travel Time From Decision Point to Major Road (t_a)[(1)(2)] (sec)
20	100	3.7
25	130	4.0
30	160	4.3
35	195	4.6
40	235	4.9
45	275	5.2
50	320	5.5
55	370	5.8
60	420	6.1
65	470	6.4
70	530	6.7

Metric

Design Speed (km/h)	Approach Distance Along Minor Road[(1)] (a)(m)	Travel Time From Decision Point to Major Road (t_a)[(1)(2)] (sec)
30	30	3.6
40	40	4.0
50	55	4.4
60	65	4.8
70	80	5.1
80	100	5.5
90	115	5.9
100	135	6.3
110	155	6.7

(1) For minor-road approach grades that exceed 3%, multiply by the appropriate adjustment factor from Figure 13.4B. Do not apply the adjustment factor to approaches with negative grades.

(2) Travel time applies to a vehicle that slows before crossing the intersection but does not stop.

ISD ASSUMPTIONS FOR YIELD CONTROLLED INTERSECTION (Crossing Maneuver)

Figure 13.4I

2. Turning Maneuvers. For the turning left or right vehicle, the approach legs are determined as follows; Illustration b in Figure 13.4H:

   a. Minor Road. The assumed turning speed from the minor road to the major road is 10 mph (16 km/h). This corresponds to an approach distance of 82' (25 m) along the minor road leg.

   b. Major Road. To determine the legs along the major road, use the same procedures as discussed in Section 13.4.2.2 for the stop controlled intersection, Equation 13.4-1 and the gap acceptance time listed in Figure 13.4J. Because the gap acceptance time are longer than the stop-controlled gap times, it will be unnecessary to determine the sight distance criteria for the vehicle which stops at the yield sign.

Design Vehicle	Gap Acceptance Time (t_g)(sec)
Passenger Car	8.0
Single-Unit Truck	10.0
Tractor/Semitrailer	12.0

Adjustments:

If the approach grade on the minor road exceeds 3%, the following applies:

1. *For right turns, multiply the percent grade of the minor road approach by 0.1 and add it to the base gap acceptance time.*
2. *For left turns, multiply the percent grade of the minor road approach by 0.2 and add it to the base gap acceptance time.*

GAP ACCEPTANCE TIMES FOR YIELD CONTROL INTERSECTIONS (Turning Maneuvers)

Figure 13.4J

13.4.4 All-Way Stop

At intersections with all-way stop control, provide sufficient sight distance so that the first stopped vehicle on each approach is visible to all other approaches. The ISD criteria for left or right-turning vehicles as discussed in Section 13.4.2 are not applicable in this situation. Often, intersections are converted to all-way stop control to address limited sight distance at the intersection. Therefore, providing additional sight distance at the intersection is unnecessary.

13.4.5 Stopped Vehicle Turning Left

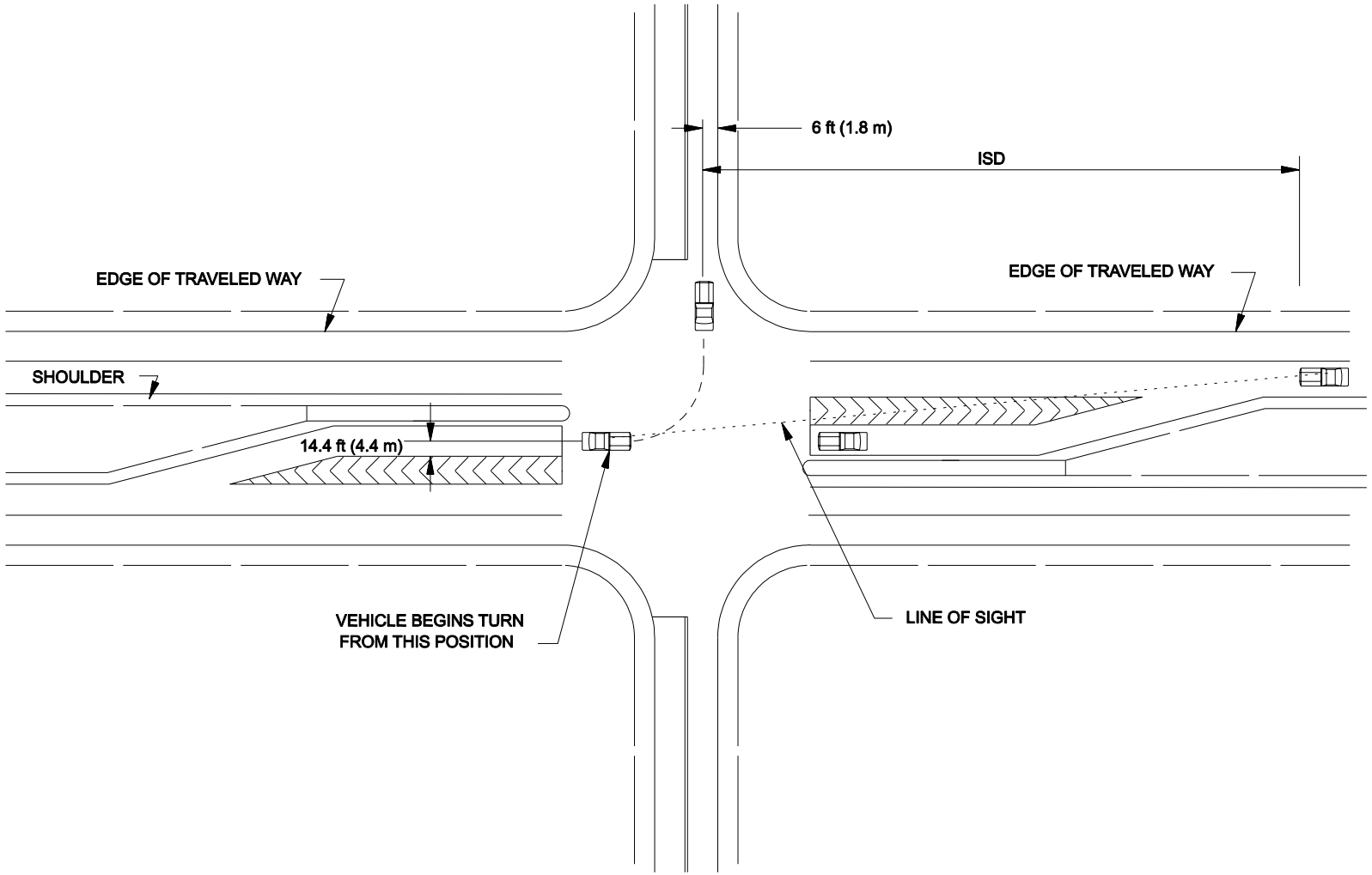
At all intersections, regardless of the type of traffic control, the designer should consider the sight distance needs for a stopped vehicle turning left from the major road. This is illustrated in Figure 13.4K. The driver must see straight ahead for a sufficient distance to turn left and clear the opposing travel lanes before an approaching vehicle reaches the intersection. In general, if the major highway has been designed to meet the stopping sight distance criteria, intersection sight distance only will be a concern where the major road is on a horizontal curve, where there is a median, or where there are opposing vehicles making left turns at an intersection.

Use Equation 13.4-1 (Page 13.4(5)) and the gap acceptance times (t_g) from Figure 13.4L to determine the applicable intersection sight distances for the left-turning vehicle. Where the crossing vehicle must cross more than one lane, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane in excess of one. Where medians are present, the designer will need to consider their effect in the same manner as discussed in Section 13.4.2.2. Figure 13.4M provides the ISD values for all design vehicles and two common left-turning situations.

13.4.6 Measures to Improve Intersection Sight Distance

The available ISD should be checked using the above noted parameters. If the ISD values from the above Sections are provided, no further investigation is needed. If the line of sight is restricted by either bridge railing, guardrail, other obstructions, or the horizontal and vertical alignment of the main road and the ISD value is not available, evaluate one or more of the following modifications, or a combination, to achieve the intersection sight distance:

1. remove the obstructions that are restricting the sight distance,
2. relocate the intersecting road farther from the end of the bridge,
3. widen the structure on the side where the railing is restricting the line of sight,
4. flare the approach guardrail,
5. revise the grades on the main road and/or the intersecting road,
6. close the intersecting road,
7. make the intersecting road one-way away from the main road, and/or
8. review other measures that may be practical at a particular location.



Notes:

1. See Figure 13.4M for ISD values.
2. See Section 13.4.5 for discussion and application.

INTERSECTION SIGHT DISTANCE FOR A STOPPED VEHICLE TURNING LEFT
(On Major Road)

Figure 13.4K

Design Vehicle	Gap Acceptance Time (t_g)(sec)
Passenger Car	5.5
Single-Unit Truck	6.5
Tractor/Semi-trailer	7.5

GAP ACCEPTANCE TIMES
(Left-Turning Vehicles from Major Road)

Figure 13.4L

U.S. Customary (Rounded for design)

Design Speed (Vmajor) (mph)	ISD (ft)					
	Passenger Cars		Single-Unit Trucks		Tractor/Semitrailers	
	Crossing 1 lane	Crossing 2 lanes	Crossing 1 lane	Crossing 2 lanes	Crossing 1 lane	Crossing 2 lanes
20	165	180	195	215	225	245
25	205	225	240	265	280	305
30	245	265	290	320	335	365
35	285	310	335	375	390	425
40	325	355	385	425	445	485
45	365	400	430	480	500	545
50	405	445	480	530	555	605
55	445	490	530	585	610	665
60	490	530	575	640	665	725
65	530	575	625	690	720	785
70	570	620	670	745	775	845
75	610	665	720	795	830	905
80	650	710	765	850	885	965

Metric (Rounded for design)

Design Speed (Vmajor) (km/h)	ISD (m)					
	Passenger Cars		Single-Unit Trucks		Tractor/Semitrailers	
	Crossing 1 lane	Crossing 2 lanes	Crossing 1 lane	Crossing 2 lanes	Crossing 1 lane	Crossing 2 lanes
30	50	55	55	65	65	70
40	65	70	75	85	85	95
50	80	85	95	105	105	115
60	95	105	110	125	130	140
70	110	120	130	145	150	160
80	125	135	145	165	170	185
90	140	155	165	185	190	210
100	155	170	185	205	210	230
110	170	185	200	225	230	255

INTERSECTION SIGHT DISTANCES
(Left-Turning Vehicles from Major Road))

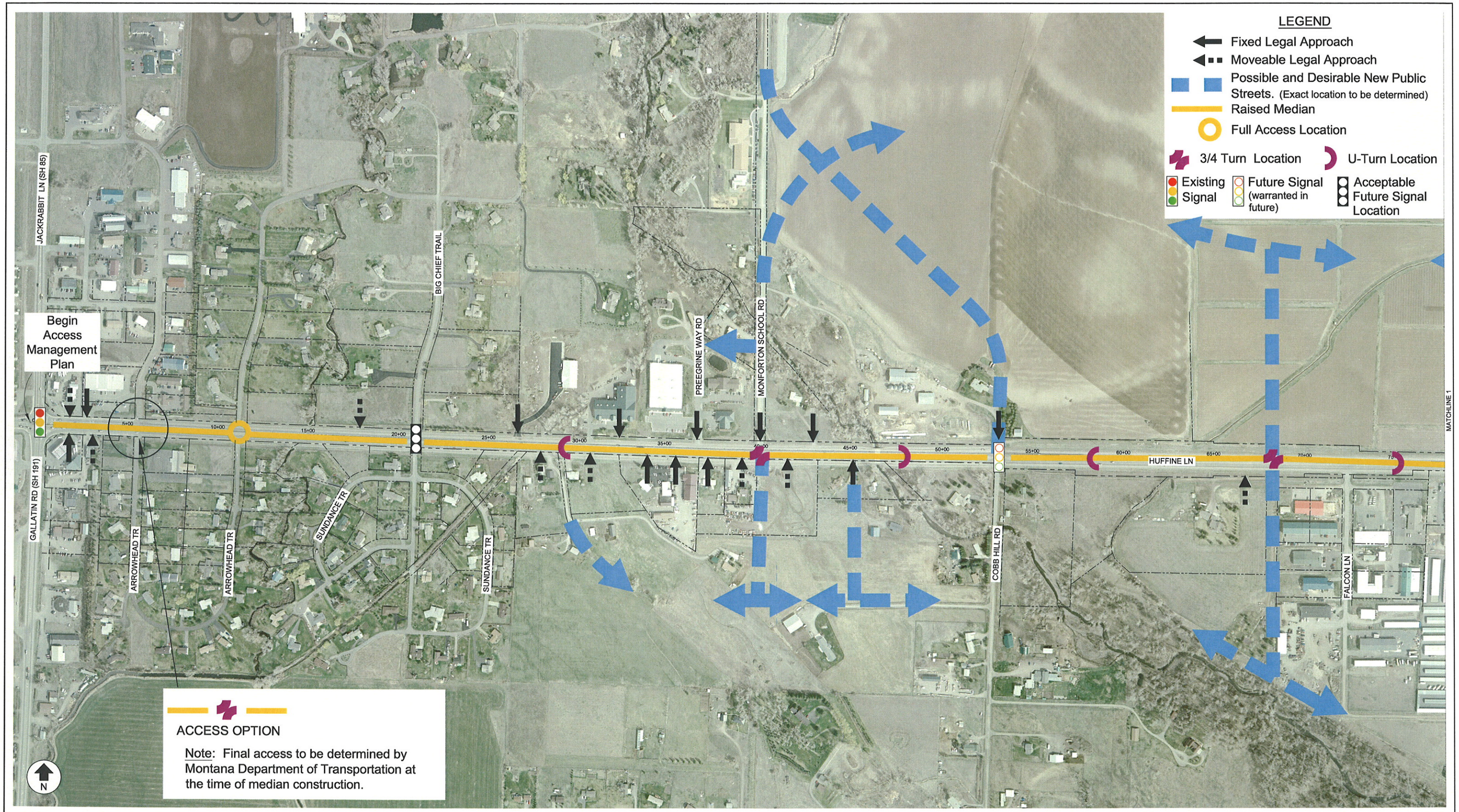
Figure 13.4M

SECTION 5
POSSIBLE AND DESIRABLE FUTURE STREET NETWORK

A supplemental street network north and south of Huffine Lane between Jackrabbit Lane on the west and College Street on the east is recommended to maximize access to parcels of land abutting or close to Huffine Lane, and to provide internal circulation among parcels. A framework for this recommended street network is shown on the accompanying graphics, labeled as Section 5, Figures 1 – 4.

Existing approved accesses to Huffine Lane, and key details of the "Huffine Lane Access Management Plan" are also illustrated so the complementary effects of the Access Plan and this supplemental street network can be better understood.

Note: The Figures shown in this section were created for an 11" by 17" sheet size. The scales shown on the sheets are for an 11" by 17" sheet size. If sheets are printed out on 8-½" by 11" paper, the scale must be adjusted accordingly.



SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

POSSIBLE AND DESIRABLE NEW PUBLIC STREETS (Exact Locations to be Determined)

Full Movements (@ 1/2 mile) - 3/4 Movements (@ 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	1"=500' (11X17)	Date	August 2007	Drawn by	RAC	Job #	AMTDOT0307	Section 5 Figure 1

MDT serving you with pride

BOZEMAN HUFFINE LANE CORRIDOR STUDY

LEGEND

- Fixed Legal Approach
- Moveable Legal Approach
- Possible and Desirable New Public Streets. (Exact location to be determined)
- Raised Median
- 3/4 Turn Location
- U-Turn Location
- Existing Signal
- Future Signal (warranted in future)
- Acceptable Future Signal Location

FUTURE ROAD TO AVOID CONSERVATION AREA

MATCHLINE 1

MATCHLINE 2

LOVE LN

HUFFINE LN

LYNX LN

TAWNEY BROWN DR

CALICO DR

ROLAND RD

ROLAND RD

GOOCH HILL RD

N

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

POSSIBLE AND DESIRABLE NEW PUBLIC STREETS (Exact Locations to be Determined)

Full Movements (@ 1/2 mile) - 3/4 Movements (@ 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	1"=500' (11X17)	Date	August 2007	Drawn by	RAC	Job #	AMTDOT0307	Section 5 Figure 2

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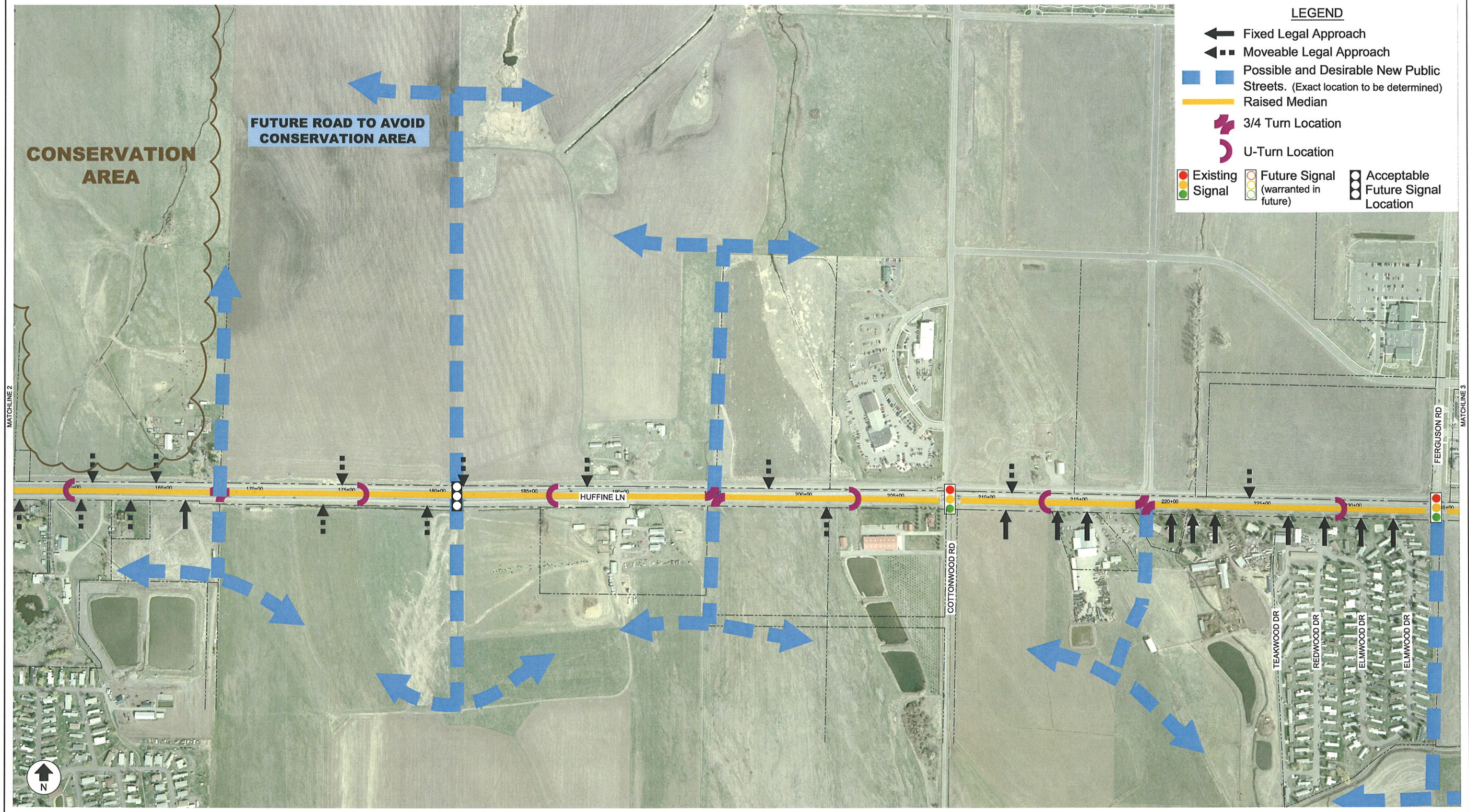
BOZEMAN HUFFINE LANE CORRIDOR STUDY



SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN

POSSIBLE AND DESIRABLE NEW PUBLIC STREETS (Exact Locations to be Determined)

Full Movements (@ 1/2 mile) - 3/4 Movements (@ 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate

Scale	1"=500' (11X17)	Date	August 2007	Drawn by	RAC	Job #	AMTDOT0307	Section 5 Figure 3

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BOZEMAN HUFFINE LANE CORRIDOR STUDY

SEH

HUFFINE LANE ACCESS MANAGEMENT PLAN					
POSSIBLE AND DESIRABLE NEW PUBLIC STREETS (Exact Locations to be Determined)					
Full Movements (@ 1/2 mile) - 3/4 Movements (@ 1/4 mile) at Public Road Intersections - U-Turns Provided Where Appropriate					
Scale 1"=500' (11X17)	Date August 2007	Drawn by RAC	Job # AMTDOT0307	Section 5 Figure 4	MDT serving you with pride BOZEMAN HUFFINE LANE CORRIDOR STUDY