

VERMONT
AGENCY OF TRANSPORTATION

**ACCESS MANAGEMENT
PROGRAM GUIDELINES**

Defining

*Access
Management*



“a process that provides or manages access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity needs, and speed.”

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THE ACCESS MANAGEMENT PROCESS:

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THE ACCESS MANAGEMENT PROCESS

Introduction

The Vermont Agency of Transportation (VAOT) uses the process of *access management* to manage access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. Communities have been encouraged to employ the principles and techniques of access management during site plan review. The process of access management is a cooperative effort on the part of the local zoning and planning agencies and the VAOT.

Access management balances mobility and access. As communities grow, it is sometimes difficult to get the most value from each parcel of land as it is developed. For example, property that does not abut a public street or highway is referred to as "landlocked." The value of the landlocked property is usually much lower than property with direct access to a public road or street. On the other hand, parcels with driveways too close to an intersection are not easily accessed if traffic frequently backs up and blocks the entrance. Clearly, the property has a much higher value if its driveway locations are well planned and designed. So the goal of access management is to achieve a safe and efficient flow of traffic along a roadway while preserving reasonable access to abutting properties. Achieving this goal requires a careful balancing act in the application of access design standards and regulations.

Where Access Management is Used

The need for better access management is most obvious in strip commercial areas where driveways are found every few feet. Too many driveways can confuse drivers, who become uncertain as to when turns into or out of driveways will be made. Their existence results in a large number of turning movements and conflicts points, increasing the potential for traffic accidents. In addition, where there are no turn lanes, each turning vehicle slows traffic and reduces the carrying capacity of the road. Unfortunately, once an access management problem is obvious, it is often too late to correct. By managing access to the highway system during project planning stages, safe access can be provided while preserving traffic flow.

Access management can benefit properties in all communities and along all types of roads. Its principles have been a part of roadway design for many years. For example, freeways function to move large volumes of traffic at high speeds for long distances because access is limited. In contrast, residential streets function primarily to provide access to homes.

The key to effective access management is linking appropriate access design to roadway function. Successful access management protects and enhances property values while preserving the public investment in our roads.

The primary design techniques used in access management focus on the control and regulation of the spacing and design of the following:

- ❑ Driveways and streets
- ❑ Medians and median openings
- ❑ Traffic signals
- ❑ Freeway interchanges

Benefits of Access Management

Transportation officials and planners are showing more interest in access management because of increasing traffic congestion, traffic safety issues, and the rising costs of road improvements. Good access management can accomplish the following:

- ❑ Reduce crashes and crash potential.
- ❑ Preserve roadway capacity and the useful life of roads.
- ❑ Decrease travel time and congestion.
- ❑ Improve access to properties.
- ❑ Coordinate land use and transportation decisions.
- ❑ Maintain travel efficiency and related economic prosperity.

Basic Principles of Access Management

Six basic principles are observed in achieving the benefits of access management.

- ❑ Limit the number of conflict points.
- ❑ Separate conflict points.
- ❑ Separate turning volumes from through movements.
- ❑ Locate traffic signals to facilitate traffic movement.
- ❑ Maintain a hierarchy of roadways to function.
- ❑ Limit direct access on higher-speed roads.

Consequences of Not Managing Access

- ❑ The efficiency of our transportation system will deteriorate, and traffic and land use conflicts will also increase.
- ❑ Poorly planned strip commercial development will be encouraged.
- ❑ The number of private driveways will proliferate.

- ❑ The existence of more driveways means more traffic conflicts, crashes, and congestion.
- ❑ The public's investment in Vermont's roadways will be diminished.
- ❑ Roads will have to be widened at great public expense to make up for capacity lost to inefficient traffic operations.
- ❑ The incompatibility of providing land service and traffic service will become more severe.
- ❑ Neighborhood streets will be used to bypass congested intersections.

Existing State and Local Access Management Programs

Good access management is frequently achieved when state and local units of government cooperate in land use and transportation management decisions. There are many examples of access management cooperation between state and local governments in Vermont, and opportunities exist for even greater cooperation.

More local governments in Vermont are developing access management programs. Many new access management efforts are being proactively adopted to head off problems before they occur. This is an important point: The best access management programs are launched before problems develop, thereby reducing traffic crashes and preserving existing road capacity. Local access management programs range in sophistication from simple standards that separate and reduce the number of new driveways, to requirements for shared driveways and frontage roads, to remediation programs in areas where access-related problems are severe. Most local access management requirements are embodied in zoning regulations and are based on corridor access management plans.

The VAOT has practiced the principles of access management in varying degrees since the early 1980s through the use of various access management techniques. These techniques have been used on Agency projects and through access permitting to mitigate the effects of development along various segments of highways. With renewed interest in corridor preservation as a method of reducing the need for transportation improvements to increase capacity, the Agency has developed the following Access Management Classification System and Standards. This system will allow the Agency to manage the State highway system in terms of levels of service and functional integrity in a coherent and coordinated manner.

**VERMONT AGENCY OF TRANSPORTATION
ACCESS MANAGEMENT CLASSIFICATION
SYSTEM AND STANDARDS**

- **PURPOSE & DEFINITIONS**
- **SECTION ONE - ACCESS CATEGORY STANDARDS**
- **SECTION TWO - DESIGN STANDARDS & SPECIFICATIONS**

PURPOSE. The following sections outline an access classification system and standards to ensure consistency in the permitting process. Title 19 V.S.A. Section 1111 provides for the control of vehicular ingress to, and egress from, the State Highway System. In essence, VTTrans considers access permit applications and approves or denies access using location and design criteria. VTTrans does not intend to deny reasonable entrance and exit to or from property abutting the highway except on limited access highways. All segments of the State Highway System shall be assigned an access category with applicable standards. The classification system and standards are intended to (1) protect and promote safety of the traveling public, (2) provide for the mobility of people and goods by preserving reasonable levels of service (LOS), and (3) preserve the functional integrity of the State Highway System by protecting the public investment in the existing highway infrastructure. The standards for each category provide VTTrans with the parameters necessary to apply consistent permitting conditions based on a uniform classification system of all State Highways.

DEFINITIONS. For the purpose of the following sections, these definitions shall apply:

- (1) "**Access**" means a driveway, street, turnout, or other means of providing for the right of access to or from the State Highway System. For the purpose of this system, two one-way accesses to a property may constitute a single connection.
- (2) "**Agency**" means the Vermont Agency of Transportation.
- (3) "**Auxiliary Lane**" means the portion of the roadway adjoining the traveled-way for parking, speed change, turning, weaving, truck climbing, and other purposes supplementary to the through-traffic movement.
- (4) "**Bandwidth**" means a width of time in seconds that a percentage of traffic would flow uninterrupted through a coordinated signal system. The greater the percentage of bandwidth, the higher the roadway capacity.
- (5) "**Change-in-Use**" means a change in the use of the property that results in increased traffic volumes entering and exiting the highway system. The Agency will use the current edition of the Institute of Transportation Engineers "Trip Generation Manual" (or actual data), to determine projected traffic volume increases. When the proposed use increases trip generation by 25% (either peak hour or daily) and exceeds 100 vehicles per day more than the existing use the Agency may require a change in access configuration or other measures to protect and promote safety and protect the public's investment in the highway infrastructure. Where such additional traffic volumes are projected or the type of vehicles being accommodated by the access changes, the property owner is required to contact the Vermont Agency of Transportation to determine if a new permit application and modifications to existing access(es) will be required. If the Agency determines that the increased traffic generated by the property does not require modifications to the existing permitted access, a new permit application shall not be required. "Change-in-Use" also means a change from residential to commercial use, regardless of trip generation with the exception of "home occupations" as defined in Chapter 117 of Title 24.
- (6) "**Controlled Access Highway**" means a highway or segment of highway where access is allowed at intersections with public roads (at grade) and/or at points designated at the time of project development.
- (7) "**Corner Clearance**" at intersections means the distance from an intersection of a public or private road to the nearest access along the State Highway. This distance is measured from the closest edge of pavement of the intersecting road to the closest edge of pavement of the access measured along the traveled way (through lanes).
- (8) "**Corner Sight Distance**" means the distance measured from a point on the drive

15 feet from the edge of the traveled-way of the adjacent roadway and measured from a height of eye of 3.5 feet on the drive to a height of 3.5 feet on the roadway where the view is unobstructed.

- (9) "**Corridor Access Management Plan**" means a plan defining site specific access management features for a particular roadway segment, developed in coordination with the appropriate local government(s) and adopted by the Agency in cooperation with the appropriate local government(s).
- (10) "**Curb Cut**" means an access or driveway providing ingress and/or egress to or from the State highway system along a "curbed" section of highway.
- (11) "**Develop**" means the partition or division of any tract of land of any size by a person through sale, lease, transfer or any other means by which any interest in or to the land or a portion of the land is conveyed to another person which will require the construction of permanent new or enlarged points of access to a state or town highway.
- (12) "**Directional Median Opening**" means an opening in a restrictive median which provides for U-turn only, and/or left-turn in movements. Directional median openings for two opposing left or "U-turn" movements along one segment of road are considered one directional median opening.
- (13) "**FHWA**" means Federal Highway Administration.
- (14) "**Full Median Opening**" means an opening in a restrictive median designed to allow all turning movements to take place from both the state highway and the adjacent connection.
- (15) "**Intersection**" as used in this section, means an at-grade connection or crossing of a local road or another state highway with a state highway.
- (16) "**Limited Access Facility**" means a street or highway especially designed for through traffic and over, from, or to which owners or occupants of abutting land or other persons have no right or easement of access, light, air, or view by reason of the fact that their property abuts such limited access facility or for any other reason. The right of access may have been donated by the property owner or purchased by the Agency.
- (17) "**Minimum Access Spacing**" means the minimum allowable distance between conforming accesses measured from the trailing edge of one access to the approaching edge of the next access measured along the edge of the traveled way.
- (18) "**Minimum Median Opening Spacing**" means the minimum allowable distance

between openings in a restrictive median to allow for crossing the opposing traffic lanes to access property or for crossing the median to travel in the opposite direction (U-turn). The minimum spacing or distance is measured from centerline of the openings along the traveled-way.

- (19) "**Minimum Signal Spacing**" means the minimum allowable distance or distance in miles between adjacent traffic signals on a State Highway System measured from centerline to centerline of the signalized intersections along the traveled way.
- (20) "**Non-Restrictive Median**" means a median or painted centerline which does not provide a physical barrier between center traffic turning lanes or traffic lanes traveling in opposite directions. This includes highways with continuous center turn lanes and undivided highways.
- (21) "**Permitting Authority**" means the Vermont Agency of Transportation which is authorized to regulate access to the State Highway System.
- (22) "**Reasonable Access**" means the minimum number of connections, direct or indirect, necessary to provide safe ingress and egress to the State Highway System based on the Access Management Classification System, projected connection and roadway traffic volumes, and the type and intensity of the land use. The applicant shall be allowed to submit any site specific information which the applicant deems to be pertinent to the Agency's review of the access permit application.
- (23) "**Restrictive Median**" means the portion of a divided highway or divided driveway physically separating vehicular traffic traveling in opposite directions. Restrictive medians include physical barriers that prohibit movement of traffic across the median such as a concrete barrier, a raised concrete curb and/or island, and a grassed or a swaled median.
- (24) "**State Highway System (SHS)**" means the network of highways that have been functionally classified and which are under the jurisdiction of the State of Vermont, as defined in State Statutes.
- (25) "**Stopping Sight Distance**" means the distance required by a driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the roadway becomes visible. It includes the distance traveled during driver perception and reaction times and the vehicle breaking distance.
- (26) "**Traveled Way**" means the portion of roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.
- (27) "**Urban**" means any territory within an incorporated area or with frontage on a

highway which is at least 50% built-up with structures devoted to business, industry, or dwellings for a distance of a quarter mile or more.

- (28) "**Urbanizing Area**" means any territory adjacent to an urban area, as described above, and with frontage on a highway which is at least 30-49% built-up with structures devoted to business, industry, or dwellings.

SECTION ONE

ACCESS CATEGORY STANDARDS

1.1 Purpose and Use

- (1) This section provides a six level access control hierarchy of classifications. The levels are called categories. The number, spacing, type, and location of access and traffic signals have a direct and often significant effect on the capacity, speed, and safety of the highway and are limited in a hierarchical method by this six level category system. The design standards within each category are necessary to ensure that the highway will continue to function at the level (category) assigned. Each state highway segment is assigned a category. These assignments are listed in the "State Highway & Class 1 T.H. Access Categories", shown in Appendix 1.
- (2) Traffic signals and their installation are also regulated by the (USDOT) *Manual on Uniform Traffic Control Devices* ("MUTCD"). Nothing, in these access category standards, is intended or shall be interpreted as requiring the Agency to authorize a traffic signal or left turn lane at any location. The Agency may, at its discretion, grant an access permit, require design and operational modifications as it deems necessary, restrict one or more turning movements, or deny the access as long as such action does not violate law.
- (3) The existing design of the highway is not required to meet the design standards of the assigned category at the time it is assigned. The goal of all new access permitting and other access design decisions shall be to meet the design standards in this section for the assigned category for the highway or segment of highway.
- (4) On an interim basis, these standards will be applied to sections of highway placed in categories based on Functional Class ("FC") and Average Annual Daily Traffic ("AADT"). In the long term, Access Management Categories will be assigned to segments of highways based on Functional Class, AADT, potential land development characteristics (Zoning & Land Use Plans), Regional Growth Patterns, and existing density of accesses. The Agency may consider some or all of these factors also when applying these standards on an interim basis where there is clearly demonstrated need to consider more than just FC and AADT.

1.2 Deeded Access Rights

Along some sections of federal-aid state highway, access rights may have been reserved and recorded in the legal instrument (deed or condemnation order) by which the limited access facility was established. The property owner so affected may inquire with the Agency about changes or purchase of such rights. The acquisition of access rights by deed or through condemnation is regulated in Title 19 V.S.A. Where the land records recognize a break in access, an access permit consistent with the requirements contained herein is still required for the physical construction and use of a driveway.

1.3 Access to Limited Access Highways

The limited access statute (19 V.S.A. 1703-1708) controls public way access to State highways that are designated "Limited Access" by the Agency. Access permits for public way access to these highways shall not be issued unless prior authorization is obtained pursuant to 19 V.S.A. 1708. Any restrictions or conditions placed on such approvals may be reflected in the access permit.

1.4 Urban Section of Highways

Access to a property, from a State highway, will be denied if the proposed land use is not in conformance with an "Approved" Town Plan.

1.5 Category One

- *Functional Characteristics*

- (1)(a) Purpose: These highways have the capacity for high speed and high volume traffic movements over long distances in an efficient and safe manner, including interstate, interregional, inter-city, and, in larger urban areas, intra-city travel.
- (b) Examples: Federal-aid interstate highways and other limited access highways that have no "at-grade" intersections are typical of this category. These highways have a functional class as Principal Arterials.

- *Design Standards*

- (2) All opposing traffic movements shall be separated by physical constraints such as grade separations and median separators. Access, consisting of directional ramps, shall be suitably spaced and designed to provide the minimum differential between the speed of the through traffic stream and the speed of the merging or diverging vehicles. Location and design of access shall be determined on an individual basis by the Agency in accordance with its authority and federal regulations governing federal-aid highway and design construction. Access to interstate highways must comply with federal regulations and receive Federal Highway Administration approval. Temporary access may be allowed during official emergencies or where directly related to an "interstate type" construction project.

1.6 Category Two

- *Functional Characteristics*

- (1)(a) Purpose: These highways have the capacity for high speed and high volume traffic movements in an efficient and safe manner, providing for interstate, inter-regional, and inter-city, travel needs and some intra-city travel needs. Direct access service to abutting land is subordinate to providing service to through traffic movements.
- (1)(b) Examples: Category two is the highest category that permits any at-grade intersections. Some highways typical of this category are VT 313 in Sunderland, VT 62 in Berlin and Barre, VT 63 in Berlin and Barre, VT 191 in Newport, Wilder State Highway in Hartford, Putney State Highway in Putney, and US 7 between Rutland and Wallingford. These highways are "limited" or "controlled" access highways, and generally fall in the categories of "Other Principal Arterials" and "Major Collectors" for functional classification.

- *Design Standards*

- (2) The design of category two highways should be capable of achieving a posted speed limit of 35 to 45 MPH where signals are present, and 45 to 55 MPH in undeveloped areas. Typical spacing of intersecting streets, roads, and highways shall be planned on intervals of one mile. One-half mile spacing should be permitted only when no reasonable alternative access to the general street system or town highway exists.
- (3) Unless otherwise specifically categorized, all ramps and access roads to the "interstate system" are category two (2).
- (4) Private direct access shall not be permitted unless access to the property was reserved when the limited access facility was established.
- (5) All access provided to a category 2 highway shall be subject to the condition that if the highway is reconstructed to a category one, alternative access may be provided by a frontage road or other means.
- (6) Opposing roadway traffic movements should be separated by physical constraints such as grade separation or a median separator of sufficient design to physically prevent illegal movements.
- (7) Junctions with heavy intersecting traffic volumes should have either grade separations or interchanges.
- (8) Traffic signals should be programmed to allow speeds of 35 to 45 MPH and a desirable bandwidth efficiency of at least 50 percent. Signals at intersections with major cross streets may be programmed to optimize traffic on both streets equally. The efficiency of the signal system should be analyzed including volume, capacity, and level of service calculations.

- (9) When a traffic signal is proposed, the Agency will specify the following:
- (a) The Segment Length.
 - (b) Signal locations (existing and anticipated) by the Agency.
 - (c) Various combinations of cycle length, progression, and speed to be used in achieving minimum band width.
 - (d) Any other conditions the Agency may consider relevant.
 - (e) Analysis/model to be used.

1.7 Category Three

- *Functional Characteristics*

- (1)(a) Purpose: These highways have the capacity for medium to high speeds or medium to high volume traffic movements over medium and long distances in an efficient and safe manner, providing for interregional, inter-city, and intra-city travel needs.
- (b) Examples: Some highways typical of this category are; US 7 (Pownal-Burlington), US 4 (Rutland-Hartford), VT 103 (Rockingham-Rutland), US 2 (Montpelier-Guildhall, VT 100 (Jamaica-Derby), and VT 30 (Brattleboro-Castleton). Direct access is generally allowed, however, the Agency may deny or restrict access. The Agency may permit access without Transportation Board Action except on certain segments of these highways that are designated as "limited access." These highways generally fall into the functional category of "Other Principal Arterials" and are generally NHS routes also. (Other Principal Arterials, Minor Arterials (with greater than 5000 AADT), and Major Collectors on State Highways and Class 1 Town Highways with greater than 5000 AADT are also in this category.)

- *Design Standards*

- (2) The design of all category three highways should be capable of achieving a posted speed limit of 35 to 45 MPH on urbanized signalized segments and preferably 50 MPH in undeveloped areas. A posted speed limit of 35 to 45 MPH in urbanized areas is acceptable where there is little or no possibility of achieving higher speeds.
- (3) Private direct access to the state highway system may be denied when the property in question has other reasonable access or reasonable opportunity to access the general street or town highway system. If the Agency determines that denial of direct access to the state highway would cause unacceptable traffic operation or safety problems at the alternative access location(s) and to the overall traffic flow of the general street system; or the proposed location is consistent with the spacing and public intersection requirements, direct access may be allowed. When direct access is allowed, such access shall continue until such time that some other

reasonable access to a lower function category street or highway is available. The access permit should specify under what circumstances the change would be required, and if known, the future access location and the date the change will be made. No more than one such access shall be allowed to an individual parcel or to contiguous parcels under the same ownership.

- (4) Where local regulations require a secondary access to provide for emergency services, the Agency may allow an emergency access. Such an access shall not be open for non-emergency uses and shall be maintained by the permittee as a closed access except during emergencies and shall be so conditioned in the access permit.
- (5) One or both left turn movements at the access may be permitted if the applicant establishes to the Agency's satisfaction that, (a) the left turn movement would not create unreasonable congestion or safety problems or lower the level of service below Agency policy, and (b) alternatives to the left turn would cause unacceptable traffic operation and safety problems on the general street system. Right turn movement may be restricted if, in the determination of the Agency, the movement creates an unacceptable operational problem or safety hazard.
- (6) Left turns shall be prohibited if a non-traversable median is already established and the proposed opening in the median does not provide the general public any significant benefits to highway traffic operations and safety or would be counter to the purpose of the median
- (7) No additional access rights shall accrue upon the splitting or dividing of existing parcels or contiguous parcels under the same ownership or control. All access to newly created properties shall be provided internally from the existing access or a new access determined by permit application.
- (8) Since intersecting public ways may in time warrant signalization, the Agency requires that all intersecting streets, roads, and highways that allow left turns meet the Agency's signal spacing criteria. Those that do not meet these requirements may be limited to right turns only. [See exception in (10) below.]
- (9) The standard for the spacing of all intersecting public streets, roads, highways, and other accesses that are or may become signalized, shall be at one-fourth mile (urban) and half mile (rural) intervals. For the purpose of achieving good arterial capacity and efficiency and to minimize delays to the traveling public, the desirable bandwidth efficiency for traffic signal progression is 60 percent and the minimum is 40 percent, and can generally be achieved when signals are optimally placed.

- (10) Exceptions to the one-fourth and one-half mile standards shall not be considered or permitted unless the proposal documents that there are no other reasonable alternatives to achieve one-fourth and one-half mile intervals, there is a proven necessity for the intersection, and a study acceptable to the Agency is completed. Where topography and existing conditions make these intervals inappropriate or not feasible, location of the access shall be determined with consideration given to topography, property ownership, unique physical limitations and/or unavoidable or pre-existing historical land use patterns and physical design constraints with every attempt to achieve the one-fourth and one-half mile spacings. The final location should serve as many properties and interests as possible to reduce the need for additional direct access to the State highway.
- (11) Any access that would reduce the optimum highway bandwidth if a traffic signal were installed may be limited to right turns only.
- (12) When a traffic signal is proposed, the Agency will specify the following:
 - (a) The Segment Length.
 - (b) Signal locations (existing and anticipated) by the Agency.
 - (c) Various combinations of cycle length, progression, and speed to be used in achieving minimum band width.
 - (d) Any other conditions the Agency may consider relevant.
 - (e) Analysis/model to be used.
- (13) When an existing access meets the warrants for a traffic signal as defined in the MUTCD and the location does not meet the Agency's requirements for signal spacing, a median separator may be installed or the access designed to direct vehicles into right turns only. These design solutions may not be practicable or feasible where there are physical constraints such as curbs, sidewalks, and lack of rights-of-way. The access may be required to be reconstructed, or relocated, to conform to the signal spacing requirements.

1.8 Category Four

- *Functional Characteristics*

- (1)(a) Purpose: These highways have the capacity for moderate travel speeds and moderate traffic volumes over medium and short travel distances providing for inter-city, intra-city, and intra community travel needs. There is a reasonable balance between direct access and mobility needs within this category.
- (1)(b) Examples: Highways in this category are generally Minor Arterials, Minor Arterials on Class 1 Town Highways, and Minor Collectors on State highways. Non-limited Access Major Collectors on State Highways and Class I TH's with less than 5000 AADT.

- Design Standards

- (2) The design of all category four highways should be capable of achieving a posted speed limit of 30 to 50 MPH. The posted speed limit shall be used to meet the requirements of this section unless an approved access control plan to improve the highway requires that a higher speed limit be used.
- (3) One access may be allowed from the state highway system to an individual parcel or to contiguous parcels under the same ownership or control where such access will not be unreasonably detrimental to the safety and operation of the highway. Additional access may be provided when the Agency determines that an additional access would not be detrimental to the safety and operation of the highway, and is necessary for the safety and efficient use of the property and additional access would not knowingly cause a hardship to an adjacent property. Where the property has a primary access to the general street or town highway system, any access to the State highway shall be considered as an additional access.
- (4) Where local regulations require a secondary access to provide for emergency services, the Agency may allow an emergency access. Such an access shall not be open for non-emergency uses and shall be maintained by the permittee as a closed access except for emergencies and so conditioned in the access permit.
- (5) Where local regulations require a secondary access to provide for other operational purposes, the Agency will work with the community to determine the extent of need.
- (6) Since intersecting public ways may in time warrant signalization, the Agency requires that all intersecting public ways that allow left turns, meet the signal spacing criteria.
- (7) The standard for the spacing of all intersecting public streets, roads, highways, and other accesses that are or may become signalized shall be at one-fourth mile (urban) or one-half mile (rural) intervals. For the purposes of achieving good arterial capacity and efficiency and to minimize delays to the traveling public, the desirable bandwidth efficiency for traffic signal progression is 60 percent and the minimum is 40 percent. To attain bandwidth efficiency it is often most important to equally space traffic signals as a part of an existing coordinated signal system.
- (8) Exceptions to the one-fourth and one-half mile standards shall not be considered or permitted, unless the proposal documents that there is no other reasonable alternative to achieve the spacing intervals, there is a proven necessity for the intersection and a study acceptable to the Agency. Where topography and existing conditions make one-fourth and one-half mile intervals inappropriate or not feasible, location of the access shall be

determined with consideration given to topography, property ownership, unique physical limitations, and/or unavoidable or pre-existing historical land use patterns and physical design constraints with every attempt to achieve the spacing intervals. The final location should serve as many properties and interests as possible to reduce the need for additional direct access to the State highway.

- (9) Access will generally be allowed in this category and will only be denied when, (a) access spacing cannot be achieved and the property has other reasonable access or, (b) sight distance is severely restricted such that mitigation efforts will not sufficiently reduce the safety hazard created by the access or, (c) the access does not meet acceptable geometric design standards.
- (10) Accesses for adjoining commercial properties will meet access spacing requirements contained herein.
- (11) Turning movements will not be restricted if, (a) the access meets sight distance requirements, (b) auxiliary lane designs are met or, (c) no restrictive median is present.
- (12) The Agency (by permit condition) may restrict turning movements in the future when turning volumes, at the access, significantly increase or volumes of mainline traffic increase such that they cause a change in access category. Left turns shall be prohibited if a non-traversable median is already established and the proposed opening in the median does not provide the general public any significant benefits to highway traffic operations and safety or would be counter to the purpose of the median.

1.9 Category Five

- *Functional Characteristics*

- (1)(a) Purpose: Category five shall be assigned only to roadways that are designated as frontage or service roads where there is no intended purpose of providing for long distance or high volume traffic movements.
- (1)(b) Examples: Some highways typical of this category are; Norwich State Highway (River Road), Coventry State Highway (Airport Road), and Berlin State Highway (Airport Road). Access needs will take priority over through traffic movements without compromising the public health, welfare, or safety. Providing reasonable and safe access to abutting property is the primary purpose of this access category.

- Design Standards

- (2) One direct access may be allowed from the State highway system to an individual parcel or to contiguous parcels under the same ownership or control where such access will not be detrimental to the safety and operation of the highway.
- (3) Additional access may be allowed when the Agency determines that (a) there will not be any significant safety or operational problems created by the additional access, (b) the spacing meets the Agency's access spacing requirements, and (c) additional access would not knowingly cause a hardship to an adjacent property.
- (4) All turning movements including left turns may be allowed provided adequate safety and design standards are met.
- (5) The existing posted speed limit shall be used in any access permit and design decisions.
- (6) Minimum spacing between signals (300 feet minimum) shall be that which is necessary for the safe operation and proper design of adjacent accesses. Preference in traffic signal timing and operation shall be given to highways and cross-streets of a higher access category or function.

1.10 Category Six (Urban)

- Functional Characteristics

- (1)(a)Purpose: These highways have the capacity for moderate to low travel speeds and moderate to high traffic volumes over medium to short travel distances providing for inter-city, intra-city, and intro-community travel needs. There is a reasonable balance between direct access and mobility needs within this category. Highways in this category may have any functional classification, however, are strictly "urban" in nature.
- (1)(b)Examples: The typical urban section of highway in this category has an existing access density of 40 accesses per mile or greater (total both sides) and a posted speed of 25-40 MPH.

It is within this access category that it often becomes necessary to provide for multiple left turning movements by construction of a section of highway allowing two-way left turn lanes, dedicated left turn lanes for high volume

access or intersections, or median barriers to control the location of left turns. Through the application of the following design standards and the design standards and specifications contained in Section Two, the need for projects to manage left turns will be minimized or controlled by mitigation methods such that favorable levels of services can be preserved.

- Design Standards

- (1) The design of all Category Six highways should be capable of achieving a posted speed of 25-40 MPH and there is little or no possibility of achieving higher speeds.
- (2) Private direct access to the state highway system may be denied when the property in question has other reasonable access or reasonable opportunity to access the general street or town highway system. If the Agency determines that denial of direct access to the state highway would cause unacceptable traffic operation or safety problems at the alternative access location(s) and to the overall traffic flow of the general street system; and the proposed location is consistent with the spacing and public intersection requirements, direct access may be allowed. When direct access is allowed, such access shall continue until such time that some other reasonable access to a lower function category street or highway is available. The access permit should specify under what circumstances the change will be required, and if known, the future access location and the date the change will be made. No more than one such access shall be allowed to an individual parcel or to contiguous parcels under the same ownership.
- (3) Where local regulations require a secondary access to provide for emergency services, the Agency may allow an emergency access. Such an access shall not be open for non-emergency uses and shall be maintained by the permittee as a closed access except during emergencies and shall be so conditioned in the access permit.
- (4) Where local regulations require a secondary access to provide for other operational purposes, the Agency will work with the community to determine the extent of need.
- (5) One or both left turn movements at the access may be permitted if the applicant establishes to the Agency's satisfaction that, (a) the left turn movement would not create unreasonable congestion or safety problems or lower the level of service below Agency policy, and (b) alternatives to the left turn would cause unacceptable traffic operation and safety problems on the general street system. Right turn movement may be restricted if, in the determination of the Agency, the movement creates an unacceptable operational problem or safety hazard.

- (6) Left turns shall be prohibited if a non-traversable median is already established and the proposed opening in the median does not provide the general public any significant benefits to highway traffic operations and safety or would be counter to the purpose of the median.
- (7) No additional access rights shall accrue upon the splitting or dividing of existing parcels or contiguous parcels under the same ownership or control. All access to newly created properties shall be provided internally from the existing access or a new access determined by permit application.
- (8) Since intersecting public ways may in time warrant signalization, the Agency requires that all intersecting streets, roads, and highways that allow left turns meet the Agency's signal spacing criteria. Those that do not meet these requirements may be limited to right turns only.
- (9) The standard for the spacing of all intersecting public streets, roads, highways, and other accesses that are or may become signalized, shall be at no less than 500 foot intervals. For the purpose of achieving good arterial capacity and efficiency and to minimize delays to the traveling public, the desirable bandwidth efficiency for traffic signal progression is 50 percent, and can generally be achieved when signals are optimally placed.
- (10) Any access that would reduce the optimum highway bandwidth if a traffic signal were installed may be limited to right turns only.
- (11) When a traffic signal is proposed, the Agency will specify the following:
 - (a) The Segment Length.
 - (b) Signal locations (existing and anticipated) by the Agency.
 - (c) Various combinations of cycle length, progression, and speed to be used in achieving minimum band width.
 - (d) Any other conditions the Agency may consider relevant.
 - (e) Analysis/model to be used.
- (12) When an existing access meets the warrants for a traffic signal as defined in the MUTCD and the location does not meet the Agency's requirements for signal spacing, a median separator may be installed or the access designed to direct vehicles into right turns only. These design solutions may not be practicable or feasible where there are physical constraints such as curbs, sidewalks, and lack of rights-of-way. The access may be required to be reconstructed, or relocated, to conform to the signal spacing requirements.

- (13) On these sections of highways, it will be most critical to apply access control measures such as: (a) Requiring access on collector streets; (b) Applying minimum spacing standards; (c) Optimizing spacing; (d) Providing for combination of accesses; (e) Requiring opportunities for future connection between properties; (f) Denying access to small frontages; and (g) Limiting turning movements. Existing access densities proposed driveway volumes and the AADT of the highway play an important part in access decisions for these urban sections.
- (14) Access proposals, that fall between two signalized intersections or accesses (500 feet or less apart), will result in one of the following decisions:
- a) Denial of access (purchase access rights)
 - b) Turning movements restricted to right-turns only
 - c) Full service access only when the proposal does not reduce the optimum bandwidth of the existing signals.
- (15) When other reasonable access exists on a side street and the proposed access location on the main highway does not meet spacing standards, access may be required on the side street. When the proposed use is "moderate to high," the access will be required on the side street. When existing access density exceeds 60 per mile, access will be required on the side street.

Access Category	Highway Functional Class (AADT)	Degree of Access Control	Direct Property Access	Driveway Controls	Traffic Operations Allowed	Design Features
1	Principal Arterials (Interstate)	Full	No	NA	Access at Interchanges Only with Public Hwys	Grade-Separated Interchanges
2	[1] Principal Arterials (Non-Interstate – LA) [2] Other Principal Arterials (LA) [3] Limited Access (LA) Major collectors	Full to Partial	No- Except by Access Rights	NA or Location	Access at Intersections with Public Highways	At-Grade or Grade-Separated at 1/2 to 1 Mile Intervals
3	[1] Principal Arterials (Non LA) [2] Other Principal Arterials (Non LA) [3] Minor Arterials (>5000 AADT) [4] Non-Limited Access Major Collectors on State Hwy & Class I TH's (>5000 AADT)	[1] Mandatory Restrictions to operations [2] Design Features [3] Land Use Issues	Deny, Restrict or Allow	NA or Number, Spacing and Location	NA or May Limit Turning Movements	[1] Physical Barriers [2] Signal Spacing Requirements [3] Left and/or Right Turn Lanes Required [4] Spacing of Public Hwy Intersection (1/4 to ½ Mile)
4	[1] Minor Collectors [2] Minor Arterials on State Hwy or Class I TH's (<5000 AADT) [3] Non-Limited Access Major Collectors on State Hwy & Class I TH's (<5000 AADT)	[1] Design Features [2] Land Use Issues	Yes	Number, Spacing and Locations	[1] All Turns In & Out [2] May Limit Turning Movements	Spacing of Public Highway Intersection (1/4 to ½ Mile)
5	Frontage or Service Roads	[1] Design Features [2] Land Use Issues	Yes	Number & Location	All Turns In & Out	Signal Spacing (No Less Than 300 Feet)
6	“Urban” Sections of Highways	[1] Design Features [2] Land Use Issues	Deny, Restrict or Allow	Number, Spacing & Location	[1] All Turns In & Out [2] May Limit Turning Movements	Signal Spacing (No Less Than 500 Feet)

Table 1-1 Access Category Standards

SECTION TWO

DESIGN STANDARDS AND SPECIFICATIONS

2.1 Purpose

The Vermont Agency of Transportation ("Agency") has developed the following design and construction standards and specifications to preserve the public investment in the highway infrastructure, protect levels of service, protect public safety, and preserve the functional integrity of public highways.

2.2 Use of this Section

- (1) When the Agency has determined that an application for access meets the requirements of section one, section two shall be used to precisely locate, design, and construct the access within the limitations, if any, set forth in section one. When local governments have established by ordinance or resolution more stringent design standards than required in this section, the local standards may govern. This information is used in conjunction with and supplements VAOT Standard Drawings B-71 and A-76.
- (2) If an access application meets section one criteria and is unable to comply with section two criteria, an access permit should be denied. When an application has been denied by the Utilities & Permits Unit, the applicant may appeal the decision to the Secretary of Transportation as provided for in Title 19 VSA § 7a.

2.3 Reference Sources and Data Requirements

- (1) *Trip Generation*. Current edition. The *Institute of Transportation Engineers (ITE)* is hereby adopted and shall be used as a reference in estimating average Peak Hour values of an access. The *ITE Trip Generation Manual* will provide a reasonable estimate of trip generation, in the absence of a traffic analysis by a qualified traffic engineer or actual collected data.
- (2) For the purposes of this section, the Design Hourly Volume (DHV) for the access location may be considered synonymous with the term "average peak hour volume" often used for traffic analysis. The Agency requires the use of DHV information for the adjacent street traffic.

- (3) Generally, the average peak hour traffic volume estimates for any access shall be based upon the anticipated total build out of the development to be served and a fifth-year prediction for highway volumes. In the case of a public access, a reasonable prediction of the fifth-year access volume shall be made based upon predicted growth, zoning, and any comprehensive plan. In urbanized or urbanizing areas, volume generation analysis shall include the anticipated full build out of the study area to a one-mile radius.
- (4) Speed, as used in this section, refers to the posted legal speed limit at the access location at the time of permit approval. A higher design speed shall be used if the section of highway is presently being redesigned or reconstructed to a higher speed or an approved access control plan requires a higher speed. Where a traffic signal will be installed as part of the initial access construction, the speed limit after signal installation may be used for the overall access design at the discretion of the Agency.
- (5) The applicant shall submit an estimate of the volume and type of traffic to use the access. The Agency shall assist any applicant requesting traffic estimates for the purpose of obtaining an access permit. To determine the average peak hour volume of the proposed access in lieu of a traffic study prepared by a transportation professional, or in the evaluation of such a traffic study, the Agency shall refer to the ITE *Trip Generation* manual, as well as site condition and other information that may apply. In determining the traffic generation, the average peak hour factor in the *Trip Generation* manual may be used. If local or special generation rates are used, all documentation for rate development shall be submitted. For mixed use developments reference is made to "ITE" for allowable trip reductions. The Agency does not conduct traffic studies for individual applicants, however, is a source for ITE figures and highway traffic counts.
- (6) When the land use will generate traffic contributing 75 or more peak hour trips (comparing build and no-build conditions) or when deemed necessary or desirable by the Agency, the applicant shall provide a traffic analysis completed and signed by a transportation professional which shall include directional distribution, level of service, design considerations, and capacity determinations unless exempted in writing by the Agency. Reference is made to the Agency's "Traffic Impact Evaluation Study and Review Guide" (July 1995) for further reference.
- (7) The distance between accesses is measured from the trailing edge of one access to the approaching edge of the next access.
- (8) Other information is provided in the "Vermont Agency of Transportation Guidelines for Traffic Engineering Issues," dated August 1995. The Agency's Level of Service Policy, Traffic Signal Warrants, and Volume Warrants for left and right turn lanes are contained in this document.

2.4 Access Width

- (1) Access width for any rural type access without curbs shall be measured exclusive of the radii or flares. Access with a street style curb return entrance and driveways with curb cuts, shall be measured exclusive of the flared sections or transitions.
- (2) Twenty-four (24) to thirty (30) feet of width shall be used for any two-way access (commercial) when the single unit vehicle volume does not exceed five in peak hour.
- (3) Thirty (30) to forty (40) feet of width shall be used for any two-way access when any one or more of the following apply to the access:
 - a. Multi-unit vehicles are intended to use the access.
 - b. Single unit vehicles in excess of 30 feet in length will use the access.
 - c. Single unit vehicles volume exceeds 5 in the peak hour.
- (4) A one-way access shall have a width of 18 feet to 24 feet. If two one-way accesses are adjacent to each other, a physical barrier of at least 4 feet wide shall divide them.
- (5) When a public street, road, highway, or any access intended to become a public roadway intersects with a state highway, the design criteria of the local government and the Agency shall be used to select an appropriate access width subject to the approval of the Agency. It is recommended that no two-way public roadway access which produces ten turning vehicles in the peak hour should be less than twenty-four (24) feet in width (exclusive of turning radii).

2.5 Access Radii

- (1) No access, except a curb cut, shall have an equivalent turning radius of less than 20 feet (see Standard Drawing B-71).
- (2) Up to a 50 foot equivalent turning radius should be used for an access when multi-unit vehicles or single unit vehicles exceeding 30 feet in length are intended to use the access on a daily basis.
- (3) The access equivalent turning radii shall accommodate the turning radius of the largest vehicle using the access on a daily basis. It is permissible to use three-centered compound curves or spiral curves rather than simple radii when designing for larger vehicles.
- (4) If the frequency of multi-unit vehicles or single unit vehicles over 30 feet in length is such that two such vehicles may be reasonably anticipated to use the access at the same time, one entering and one exiting, radii should be adequate to accommodate both vehicles with no turning conflicts.

- (5) The Agency shall determine if a curb cut or radius curb returns are required in accordance with existing or planned conditions. The determination is normally made by the presence of curb on the main highway. Where the main highway is not curbed, any proposed curbing on an access will be offset a minimum of 6 feet from the main highway edge of traveled-way.
- (6) When a public street, road, highway, or any access intended to become a public roadway intersects with a state highway, the design criteria of the local government and the Agency shall be used to select appropriate radii, corner and intersection design, subject to approval by the Agency. The final design should not be less than the minimums contained in these standards or Standard Drawing A-76.
- (7) Where large numbers of multi-unit vehicles will use the access, the access width or radius may be increased, as approved by the Agency, to ensure safe turning movements without encroachment on to opposing highway traffic lanes.
- (8) Where there are numerous accesses such as along an established city street, it may be desirable to reduce the radii in order to improve visual and physical separation of accesses. Where feasible, access should be combined or closed to reduce the frequency of accesses and increase the spacing between accesses.
- (9) Where a private access will have high traffic volumes, the access may be designed with curb returns and at a width and design as to adequately provide for the level of activity.
- (10) To minimize pedestrian conflict and total access width at the roadway edge, radii shall not be constructed larger than required to accommodate the volume and types of vehicles using the access on a regular basis.
- (11) Where access channelization islands are installed, a larger radius may be required for the channel lane. Traffic islands should be 80 square feet in size or larger. All islands must be offset at least four feet from the edge of the highway travel lane to face of curb. To ensure one-way operation of directional islands, the 4-foot offset is recommended by AASHTO. All other islands are offset between 6 and 12 feet.

2.6 Access Surfacing & Pavement Markings

- (1) Surfacing material may be defined as gravel, concrete, or bituminous pavement.
- (2) The access shall be surfaced upon completion of earthwork construction and prior to being used. A delay in installation of hot bituminous pavement due to seasonal restrictions may be allowed provided adequate temporary gravel surfacing is substituted.
- (3) The surfacing of the access shall extend at least from the highway edge of pavement to the right-of-way line, or to the end of the turning radius as a minimum.
- (4) Surfacing material shall be specified according to the Agency's standard design specifications and the conditions and future use of the access and the highway. Gravel or crushed stone will be permitted for individual residential access or field entrances where conditions allow, and where curbs are not required.
- (5) Off roadway surfacing improvements (such as parking areas) shall not be allowed within the highway right-of-way unless a curbing or other physical barrier, such as a drainage ditch, is constructed and maintained to limit access movements to permitted locations. Use of the right-of-way for parking may be prohibited unless approved by permit or lease with the Agency.
- (6) Reference is made to the Agency's Pavement Marking Guidelines for further guidance on this subject.

2.7 Speed Change Lanes

Speed change lanes, also called auxiliary lanes, are required according to the subsections that follow.

- (1) *General Criteria for Speed Change Lanes*
 - a. An auxiliary lane shall be parallel and immediately adjacent to the through lane for its entire required length.
 - b. When public safety so requires, due to site specific conditions such as limited sight distance, a turn lane may be required even though the lane may not meet the warrants for relieving traffic congestion.

2.8 Corner Sight Distance (CSD)

These sight distances apply to vehicles approaching an access and to vehicles exiting an access. These distances are measured from a point on the drive 15 feet from the edge of traveled way of the adjacent roadway and measured from a height of eye of 3.5 feet on the drive to a height of 3.5 feet on the roadway. Corner Sight Distance is a function of posted speed and applies to all access categories. When the minimum values below cannot be obtained, refer to Standard Drawing B-71 for minimum Stopping Sight Distance required and the necessary actions to mitigate an unsafe condition. If an unsafe condition cannot be mitigated, it may be necessary to deny access for the specific use.

Table 2-1 - Corner Sight Distance

POSTED SPEED LIMIT (mph)	MINIMUM CORNER SIGHT DISTANCE (ft)
25	280
30	335
35	390
40	445
45	500
50	555
55	610
60	665
65	720

(Please note that the CSD values above are less than those currently in AASHTO. However, they are more reflective of actual driver behavior than the AASHTO model, and will produce designs more appropriate for Vermont, where attainment of the generous AASHTO values is often difficult to impossible. Standard Sheet B-71 will be revised when time permits to reflect the above values.)

The CSD values are based on an assumption of a gap of 7.5 seconds in the traffic stream on the highway mainline based on the highway design speed. This allows a stopped passenger vehicle to enter the mainline from the side road or drive without unduly interfering with the highway operations. The conceptual approach of gap acceptance and the value of 7.5 seconds are based on a Midwest Research Institute study which, when published, will recommend a replacement of the overtaking vehicle conceptual model currently in the AASHTO Green Book.

2.9 Access Spacing

Current research and practice identify much greater access spacing requirements for unsignalized intersections including driveways. These may not be practical for Vermont considering existing terrain features and, vertical and horizontal roadway alignments that often control access locations. Traffic operational factors suggesting

wider spacing of driveways (especially along highways with medium and higher volume driveways) include weaving and merging distances, stopping sight distance, acceleration rates, and storage distance for back-to-back left turns. From a spacing perspective, high volume driveways should be treated the same as public streets.

For unsignalized access spacing standards, the Agency uses the lower limit of the AASHTO stopping sight distance approach. The resultant spacing standards, shown in Table 2-2, would enable a driver traveling at the design or posted speed to monitor only one driveway at a time and, if necessary, to stop.

Table 2.2 - Unsignalized Access Spacing (ft)

POSTED SPEED or DESIGN SPEED (mph)	UNSIGNALIZED ACCESS SPACING* (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495

(*Spacing shown is based on level terrain; adjustment factors are required for segments with grades)

Source: Derived from Exhibit 3-1(Pg.112) (Stopping Sight Distance) from AASHTO A Policy on Geometric Design of Highways and Streets, 2001

As these standards are applied, especially along highways with considerable amounts of existing development, in many cases it will not be possible to achieve the defined standard. Rather, it is important to "maximize" spacing achieving the "best possible" driveway spacing given the property limits and physical constraints.

The minimum spacing requirement between any access and any entrance or exit ramp, providing access to any limited access highway, will be 500 feet in rural areas, and 250 feet in urban areas. When this spacing requirement cannot be obtained due to property limitations, the Agency will consider the purchase of access rights or the maximum attainable distance will be provided between the ramp and the access.

2.10 Corner Clearance at Intersections

- (1) Corner clearances for accesses shall meet or exceed the minimum access spacing requirements (in Paragraph 2.9).
 - a. If, due to property size, corner clearance standards of this Section cannot be met, and where joint access which meets or exceeds the applicable minimum corner clearance standards cannot be obtained with a neighboring property or, in the determination of the

Agency, is not feasible based on conflicting land use or conflicting traffic volumes/characteristics, then the following minimum corner clearance measurements can be used to permit accesses. Such properties, for the purpose of this section, will be called "isolated corner properties."

- b. In cases where accesses are permitted under the criteria of the following minimum corner measurements, the permit will contain the following additional conditions:
 - i) There will be no more than one access per state road frontage.
 - ii) When joint or alternate access that meets or exceeds the applicable minimum corner clearance becomes available, the permittee will close the permitted access. Exceptions may be allowed when the permittee shows that such closure is not feasible because of conflicting land use or conflicting traffic volumes/characteristics or existing structures that preclude a change in the existing access.
- c. The minimum corner clearance measurements for these "isolated corner properties," set forth in a. above, shall be used for isolated corner properties, as defined in this section.
- d. **Corner Clearances for "isolated corner properties"** are as follows:

**Corner Clearance at Intersections
With Restrictive Median**

Position	Access Allowed	Minimum (Feet)
Approaching intersection	Right In/Out	115
Approaching intersection	Right In Only	75
Departing intersection	Right In/Out	230
Departing intersection	Right Out Only	100

**Corner Clearance at Intersections
Without Restrictive Median**

Position	Access Allowed	Minimum (Feet)
Approaching intersection	Full Access	230
Approaching intersection	Right In Only*	100
Departing intersection	Full Access	230
Departing intersection	Right Out Only*	100

(*Right In/Out, Right In Only, and Right Out Only accesses on roads without restrictive medians shall, by design of the access, effectively eliminate unpermitted movements.)

2.20 Other Design Elements

- (1) Access specifications shall ensure that the access is designed and constructed in a manner that will encourage proper use by the motorist. Access for one-way operation shall be approved only when design conditions ensure one-way operation.
- (2) An access that has a gate across it shall be designed so that the longest vehicle using it can completely clear the traveled-way, shoulder, and sidewalk when the gate is closed.

- (3) The access shall be designed to facilitate the movement of vehicles off the highway to prevent vehicles from forming and/or waiting in a line (queuing) on the traveled-way. An access shall not be approved for parking areas that require backing maneuvers that encroach on the traveled-way of the highway. All off-street parking areas must include on-site maneuvering areas and aisles to permit user vehicles to enter and exit the site in forward drive without hesitation other than that required by official traffic control devices.
- (4) Access design shall provide for the safe and convenient movement of all highway right-of-way users including, but not limited to, pedestrians, bicyclists, and the physically handicapped including those in wheelchairs. Sidewalks may be required where appropriate and when requested by local authority.
- (5) Where necessary to remove, relocate, or repair traffic control devices or public or private utilities for the construction of a permitted access, the relocation or removal shall be accomplished by the permittee without cost to the Agency, and at the direction of the Agency or utility company. Any damage to the State highway or other public right-of-way beyond that which is allowed in the permit shall be repaired immediately.
- (6) Further details of access construction and design, including pavement thickness and specifications, curb design and specifications, roadway fill design and compaction, pavement markings, and other specific details, shall be provided by the Agency based on the Agency's Standard Specifications for Construction, the General and Special Provisions, and the Roadway Design Manual.
- (7) Installation of any traffic control device necessary for the safe and proper operation and control of the access shall be required pursuant to the M.U.T.C.D. Where the access may warrant signalization in the future, phasing of the installation (turn lane work and signal work) may be required. All traffic control devices within the highway or other public right-of-way or access that serve the general public shall conform to the M.U.T.C.D.
- (8) An access that crosses or otherwise affects pedestrian, bicycle, or handicapped accessible facilities, shall have the necessary modifications to ensure the safe crossing of the access and the safe use of the facility by pedestrians, bicyclists, and the handicapped.
- (9) When an access permit requires the widening or reconstruction of the roadway, the design of horizontal and vertical curves, super-elevations, transitions, and other specifications, shall be no less than those necessary to meet the minimum posted speed of the highway or the constructed design speed of the existing highway, whichever is greater and shall not be of a lesser design than the current design.

- (10) Physical separation and delineation along a property frontage such as curb and gutter or fencing may be required where necessary to ensure that access will be limited to permitted locations.
- (11) A clear zone is a relatively clear and flat area beyond the edge of the roadway and is important for the recovery of errant vehicles. The access permit may require that roadway hazards in the clear zone such as fixed objects or steep embankments be removed, reconstructed, or shielded by a proper barrier. In urban areas with speeds of 40 MPH or less and vertical barrier curbs, a clear zone of at least 1.5 feet minimum should be provided. Where there is no curb in urban and rural areas and the speed is 40 MPH or less, a ten-foot clear zone should be provided. At speeds of 45 MPH or greater, a 30 foot clear zone is recommended. Every attempt will be made to adhere to the clear zone requirements.
- (12) Landscaping may be allowed within the rights-of-way and within the "clear zone;" reference is made to the Agency's guideline on this subject for more detailed information.
- (13) Each access shall be constructed in a manner that shall not cause water to enter onto the roadway, and shall not interfere with the existing drainage system in the right-of-way.
- (14) The permittee shall provide, at his/her own expense, drainage structures for his/her access which will become an integral part of the existing drainage system. The type, design, and condition of these structures must meet the approval of the Agency.
- (15) The highway drainage system is for the protection of the State highway right-of-way. It is not designed or intended to serve the drainage requirements of abutting properties beyond that which has historically flowed to the State right-of-way. Drainage to the State highway right-of-way shall not exceed the undeveloped historical flow. The use of controlled flow detention ponds shall be considered to control this flow from developed property. Any requests to attach drainage pipes to the Agency's drainage system must be approved by the Agency after review by the Agency's Hydraulics Unit.
- (16) The permittee, his/her heirs, successors-in-interest, assigns, and occupants of the property serviced by the access shall be responsible for meeting the terms and conditions of the permit, the maintenance of the access beyond the edge of the traveled-way, and the removal or clearance of snow or ice upon the access even though deposited on the access in the course of the Agency snow removal operations. The Agency shall maintain the highway drainage system, including those culverts under the access, which are part of a closed drainage system within the right-of-way.