THE DISTRICT MUNICIPALITY OF MUSKOKA

Managing Our Legacy Together

POLICY AND PROCEDURES

FOR

ACCESS ONTO

DISTRICT ROADS

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1. INTRODUCTION

1.1 Purpose

The purpose of this policy is to preserve and/or improve upon the integrity of the roadway network while recognizing that one of the keys to successful development is a properly designed access. This is accomplished by promoting a progressive and high caliber design standard for access.

1.2 Goals

The factors which affect the operation of an access and the roadway include the location, geometrics of the access, auxiliary lane requirements, capacity of the roadway, drainage, safety and operational efficiency of the access as they relate to the roadway and land use. Access to private property should consider the location and number of accesses required and provide good service to users while at the same time minimizing interference to roadway traffic.

The goals of this policy are:

a) to provide the maximum protection to the public through the orderly control of traffic movements onto and from the road network;

b) to maintain the traffic carrying capacity of the road network;

c) to protect the public investment in roadway facilities;

d) to reduce the potential for and the severity of collisions thereby protecting investment in property and personal well being.

e) to minimize public investment in maintenance functions;

f) to ensure uniform practices in the design and construction of accesses for the safety of the general motoring public;

g) to maintain and regulate legal access to private property fronting onto a highway.

2. DEFINITIONS

A sketch illustrating various terms defined herein is attached as Figure 1, Page 18.

Entranceway

An entranceway is the means by which vehicles are provided with ingress to or egress from a public or private property to the roadway.

Non-Commercial Access

A non-commercial access is one providing access to a residential use of six units or less or to agricultural land, including field accesses

Commercial Access

A commercial access is one providing access to property being used other than for a residential use of six units or less or for farm or field uses.

High Volume Commercial Access

A high volume commercial access is one providing access to facilities which generate high volumes of traffic and/or heavy truck traffic, i.e. shopping centres, athletic fields, hospitals, industries, temporary subdivision roads, etc.

Mutual Access

A mutual access is one providing access to adjoining properties under common and/or separate ownership.

Temporary Access

A temporary access is one providing access to a property for a specified period of time for the purpose of construction, repairs or improvement on that property or to facilitate staged development.

Auxiliary Lane

An auxiliary lane is a lane parallel to the roadway and its associated taper which are provided to assist in the acceleration or deceleration and storage of vehicles entering or leaving the roadway.

Boulevard

A boulevard means that portion of the highway situated between the curb line and the property line of the lot abutting the highway, but does not include a sidewalk or shoulder.

Centre Line

The centre line is the line dividing an access into two parallel portions.

Curb Line

a) Where a curb has been constructed, means the line or curb, and
b) Where no curb has been constructed, means the edge of the roadway.

Day-Light Triangle

A day-light triangle includes land acquired as part of the highway which is intended to provide clear vision for the safe movement of traffic or improved turning lanes.

District

The District means The District Municipality of Muskoka.

Engineer

The Engineer means the District Engineer for the District Municipality of Muskoka or his designate.

Frontage

The frontage is the length of property line abutting a highway.

Highway

A highway includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle designed and intended for, or used by, the general public for the passage of vehicles and pedestrians and includes the area between the lateral property lines thereof.

Property Line

A property line is the common boundary line between two adjoining properties under common and/or separate ownership.

Radius

The radius is the curved outer edge of an access connecting the throat to the curb line.

Roadway

Roadway means that part of the highway that is improved, designed or ordinarily used for vehicular traffic, but does not include the shoulder, and, where a highway includes two or more separate roadways, the term "roadway" refers to any one roadway separately and not to all of the roadways collectively.

Low Speed Roadway

A low speed roadway is one with a designated speed limit less than 70 km/h.

Shoulder

The shoulder is that part of the highway lying adjacent to the roadway which is improved with granular or paved surface and is not intended for the passage of vehicular traffic.

Throat Width

The throat width is defined by the minimum width dimension at the intersection of the radius points with the parallel portion of the access.

Traffic

Traffic includes all vehicular and pedestrian activity occurring on or adjacent to the highway.

3. ADMINISTRATION

3.1 Authority

An access permit is required to ensure conformity with Controlled Access By-law 79-15 as amended of the District Municipality of Muskoka and with this policy.

3.1.1 Controlled Access

No person shall construct, alter the geometric design of, enlarge or otherwise use any access to a highway designated as Controlled Access unless said access has been approved by the Engineer upon issuance of an access permit pursuant to this policy.

3.2 Penalty

Any person violating any provision of a Controlled Access By-law as amended shall be guilty of an offense and shall be liable on conviction to a fine as indicated therein.

3.3 Access Permit

An access permit may be required as a condition of approval of a development approval application including a severance, plan of subdivision, rezoning, variance or site plan approval or when a new access or change to an existing access is proposed. The permit fee shall be established by by-law from time to time.

The District may require the applicant to construct, alter the geometric design of or retain any access within the highway.

An access constructed or altered under the provisions of Controlled Access By-law #79-5 as amended shall conform to this policy and all conditions and provisions attached to any access permit issued.

3.4 Application For Access

Applications for access forms may be obtained by telephone or in person from the Traffic Engineering Section of the District Roads and Traffic Division. Applications are to be completed by the applicant and delivered by mail or in person to the District Traffic Engineering Section along with two copies of a site plan. The site plan should be drawn to scale and when applicable provide the following information:

Existing:
- property lines (dimensions and bearings)
- width and location of roadway and highway
- curbs
- shoulders
- boulevard
- ditches
- existing accesses
- aboveground utilities
- parking and traffic control devices
- landscaping
- existing structures
- adjacent land uses
- a key plan (indicating location of property)
- legal description of property
- north arrow

Proposed: The geometrics of:
- proposed accesses
- curb returns
- highway widenings
- auxiliary lanes
- pavement markings
- parking layout
- landscaping
- paved areas
- buildings
- site circulation

The applicant may be required to stake or suitably mark the location of a proposed access and/or the limits of the frontage of the subject property immediately following an application for access. The applicant is responsible for ensuring that any application for access complies with any applicable local land use and zoning by-laws.

3.5 Processing Procedures For Applications For Access

Since the District receives a large number of applications for access and as the amount of time required to process each application varies with the complexity of the specific proposal, applicants are advised to make application well in advance of the proposed commencement of work.

Upon receipt of an application for access the District Traffic Engineering Section will circulate the application to District and local agencies affected. Where an access permit is issued, the final design, number and location of accesses may reflect the concerns expressed by the agencies circulated.

3.6 Access Permit Approval

Once an application has been approved an access permit will be forwarded to the applicant. No work shall be undertaken on the highway until the access permit has been received by the applicant.

The access permit will be issued only for the specific development proposal indicated on the application for access.

An access permit shall not release the applicant from compliance with other District and local by-laws or other requirements.

An access permit is transferable within the time period specified on the permit should ownership of the subject property be changed. The new property owner will be bound by the conditions of the access permit.

An access permit shall indicate a specific date by which construction of the access must be completed otherwise the permit will expire and become null and void. The maximum time period is one year from the date of approval. Should the applicant desire to amend his application at anytime or construct an access after expiry of the access permit, he is required to re-apply in writing. The above time limit will not apply to plans of subdivision which have received "Draft Approval". Should "Draft Approval" status be rescinded the permit will become null and void.

Access permits may be issued for the construction and operation of a temporary access for a specified period of time. Such permits will indicate the date upon which the access will be removed. should the applicant desire to extend the expiry date of a temporary access permit, he is required to re-apply in writing. The maximum period is one year from the date of approval.

Where access is desired for a period of seven days or less to allow for construction, repair or improvement on that property, and no alternate point of access is available, an access permit is not required. However, the applicant will be required to obtain a Roadway Occupation Permit from the Traffic Engineering Section which will specify the restoration requirements.

3.7 Appeal

An applicant may appeal the decision of the District Engineer or his designate as to the issuance of a permit or any conditions thereto by requesting a review in writing within 30 days of the date of the dates in dispute. Unless Council directs otherwise, all such requests shall be referred to the Engineering Committee of the District Municipality of Muskoka for report to Council.

3.8 Costs

All costs associated with the approval and installation of the access shall be borne by the applicant. These costs may include any and all costs for the construction or alteration of an access such as labour and materials for the access itself, alteration to the roadway, utilities, traffic control devices, layout and surveying of the access, legal costs, preparation of plans, removal of non-conforming works, etc.

Where the District constructs or reconstructs a roadway, the District may improve existing accesses within the highway where required at the District's expense.

3.9 Roadway Occupation Permit

An applicant may be required to obtain a Roadway Occupation Permit as a condition of an access permit. (While work is carried out, care must be taken to ensure the protection of workmen and minimization of interference with normal traffic operation. All signing and traffic control shall be in compliance with the Manual of Uniform Traffic Control Devices for Ontario (M.U.T.C.D.))

A copy of the Access Permit and Roadway Occupation Permit shall be available on - site during construction at all times.

All works carried out under a Roadway Occupation Permit within the highway shall be done by the District, its' designate or an approved contractor.

3.10 Acceptance Of The Works

A field inspection will be carried out upon completion of the works or at the expiration of the access permit whichever occurs first. The District reserves the right to have any modifications performed if the installation does not conform to the access permit at the applicants cost.

Where a culvert is installed it shall be inspected by the District prior to the placement of any backfill material. Culverts installed otherwise shall be removed at the discretion of the District at the applicants cost.

3.11 Maintenance Of Accesses

Property owners having access onto a District Road are fully responsible for the maintenance of the access serving the property including the removal of snow and ice and keeping the portion of the access within the highway in a safe condition for vehicular traffic.

A culvert installed under the terms of the access permit shall become the property of the District upon acceptance of the work and all subsequent maintenance, repairs, alterations, etc. shall be the responsibility of the District.

4. PRINCIPLES

This policy has been prepared using fundamental engineering and planning principles and is provided to afford property owners a better understanding of District requirements relating to access.

4.1 General Principles

a) Access to the District Road may be allowed where it is determined by the District Engineer that District Road access is required to support an arterial oriented land use designation and safe access can be designed according to the criteria set out in this policy.

b) New subdivisions shall be provided with access from local streets. Exceptions to this provision will be considered where development is of an infilling nature and/or it is evident that direct access is acceptable from a traffic operations viewpoint.

c) New access to District Roads for new non-farm related, residential lots created outside settlement areas as designated in the District and Area Municipality Official Plans will conform to provisions of the District Official Policies Plan and the Area Municipality Official Plan.

4.2 Principles Of Design

a) Reduction of the speed differential between through vehicles and vehicles using the access;

b) Compatible interaction among all points of access;

c) Prohibition of the use of the highway as a portion of the internal circulation system of abutting property;

d) Discouragement of hazardous traffic movements which may prove detrimental to the operation of the roadway;

e) Preservation or improvement of the effectiveness of traffic control devices (i.e. traffic control signals);

f) Control of the method and type of access construction in order to minimize hazards to traffic.

4.3 Auxiliary Lanes

Auxiliary lanes to promote smooth ingress or egress at an access may be necessary for capacity purposes where the roadway and/or turning volumes are high or for the motorists safety when the roadway speeds dictate. The final determination of the need for such facilities shall rest with the District.

The design of auxiliary lanes shall be in accordance with the current edition of the Roads and Transportation Association of Canada (R.T.A.C.) Manual and shall take into consideration the speed differential between through vehicles and those using the access and the amount of vehicular storage that will be required. Where circumstances dictate, the volume and size of trucks that will use the auxiliary lane and the steepness of an ascending or descending grade shall be taken into consideration.

4.4 Median Openings

Where roadways have been constructed with a centre median, openings in the median for new private accesses will generally not be permitted. Under special circumstances and based on substantial trip generation calculations, the District may consider the need for additional mid-block median openings and their related traffic control strategy.

The layout of accesses should take advantage of existing or pre-planned openings. In such cases, the construction of left turn lanes should be considered.

4.5 Shoulders

The shoulders adjacent to an access shall be constructed/reconstructed to match the shoulders in the immediate area. A paved access constructed where drainage is carried by an open ditch, shall have in addition to the required width of pavement, a shoulder constructed parallel to the pavement edge of at least 1.0 metre width. This shoulder shall be constructed within the highway and extend onto private property as required.

4.6 Illumination

Property owners may be required to illuminate a Commercial or High Volume Access used after dark. Such illumination may be erected on private property or on the highway subject to an encroachment agreement. Any illumination must not constitute a nuisance to traffic nor resemble traffic control signals.

4.7 Traffic Control Devices

Property owners may be required to permit a traffic control device such as regulatory or warning signs, traffic control signals, delineators, pavement markings, parking meters, etc. to be installed, relocated or removed on a highway. All such devices shall be in accordance with the M.U.T.C.D. and District Municipality of Muskoka standards. The installation, relocation, removal and maintenance of such devices shall only be undertaken by the District or its designate.

Property owners may also be required traffic control devices to be installed, relocated or removed on private property. All such devices shall meet the approval of the District and the installation, maintenance, relocation and removal of such devices shall be the responsibility of the applicant.

4.8 Location Of Accesses

In the interest of public safety and convenience, the location of an access may be restricted to a particular location along the applicant's frontage. Generally an access must be located so as to provide:

a) favourable vision, grade and alignment conditions for all traffic using the proposed access and the roadway;

b) no undue interference with the safe movement of through traffic;

c) safety and convenience for pedestrians and other users of the highway.

In general, accesses will not be permitted:

a) along a lane which is identified for the purpose of an exclusive vehicular turning movement;

b) in close proximity to traffic control signals;

c) in close proximity to intersections

d) in close proximity at grade railway crossings;

e) in close proximity to abutments or structures on a highway;

f) within the day-light triangle at an intersection;

g) where minimum sight distance requirements are not met.

Additional requirements regarding the location of accesses are included in Appendix "C", Page 26.

4.9 Number Of Accesses

Each application for an access permit shall be considered on its own merit. Need must be demonstrated or substantiated where multiple accesses are requested. Careful consideration must be afforded to the internal circulation, layout and frontage with a view to minimizing the disruption of traffic while achieving optimum spacing between points of intersection with District Roads. Direct access from single lots of a new subdivision onto a District Road will be discouraged.

4.10 Layout Of Accesses

The throat width, angle, radius and other geometric features of an access and islands will be considered when determining access layout.

4.10.1 Throat Width

The throat width of accesses shall be based on the speed and volume of through traffic on the roadway and the type and volume of vehicles using the access. Accesses shall be wide enough to prevent vehicular conflict in the access or on the roadway yet definitive enough to prevent parallel entry in to the traffic stream, while at the same time recognizing its use by pedestrians. Throat width requirements are included in Appendix "B", Page 25.

4.10.2 Radius

In all cases, the throat width shall be increased by a specified radius to allow for smooth ingress and egress at the roadway connection. The radius for an access is dependent upon and must be compatible to the desired departure speeds of the drivers and must be correlated to the required level of service for known or planned use. The outside edge of a radius will be curved around a radius point and shall tie into the throat of the access and the existing curb line. Where the width of the highway is restrictive, a compound curve may be acceptable. Radius requirements are included in Appendix "B", Page 25.

The selection of a radius for an access with truck generated traffic will require special consideration and will be determined using turning vehicle templates designed in accordance with R.T.A.C. specifications so as to prevent vehicles which use the access from encroaching outside the curb lanes of traffic. All radii for Commercial and High Volume Commercial Accesses shall be defined by curbing where the adjacent roadway has curb and/or gutter existing.

The radius may fall onto the applicant's property where the highway is narrow and may project beyond the point of intersection of the property line at the curb line. However, it shall not interfere or prejudice the design of an adjacent access.

4.10.3 Definition

Multiple accesses will require separation by the use of curbing and/or landscape treatments to create positive identification of the access and good on site circulation characteristics. At the discretion of the District, curbing may also extend into the highway to reinforce positive access definition. All such treatments shall conform with applicable back by-laws, if any.

Where on site parking facilities are in close proximity to the access itself, curbing may be required to extend onto private property so as to ensure an adequate queuing area and to minimize on site interference between those intending to use the access and the internal traffic.

4.10.4 Mutual Access

4.10.4.1 Non-Commercial Accesses

A mutual Non-Commercial Access shall straddle or abut the property line and shall not exceed twice the minimum access width specified for the appropriate speed classification of the roadway.

4.10.4.2 Commercial Accesses

A mutual Commercial Access shall straddle or abut the property line and shall not exceed the maximum access width specified for the appropriate speed classification of the roadway.

4.10.5 Angular Placement

All accesses should be constructed so that the centre line is at right angles to the curb line. No access shall be constructed with a centre line angle measured from the roadway of less than 70 degrees.

An angled Commercial Access may be allowed for high speed or one way roadways, large volume movements or special function land uses.

4.10.6 Number of Lanes

A High Volume Commercial Access shall be designed to avoid congestion caused by traffic entering or exiting the facility. The number of lanes on the access shall be determined by the District in consideration of the anticipated trip generation and distribution.

5. DESIGN SPECIFICATIONS

Property owners are advised that it may be in their best interests to retain the services of a professional engineer or other qualified consultant for the purposes of identifying grade, drainage, construction, circulation, illumination and other development requirements.

5.1 Grades

5.1.1 Existing Gutter

The grade of an access within the highway where the gutter exists shall not exceed 10%. Where the access profile forms a crest curve, the access grade beyond the highway shall not exceed 8% change within any 3.0 metres distance as shown on Figure 2 on Page 19. This will avoid vehicles "bottoming" on the crest. Where the access profile forms a sag curve, the access grade beyond the highway shall not exceed 10% change within any 3.0 metres distance as shown on Figure 2 on Page 19. This will avoid the bumper of a vehicle "dragging" on the sag.

5.1.2 Existing Ditch

The grade of an access where no curb and gutter exists shall slope away from the curb line at a rate equal to the slope of the shoulder and shall continue for a distance equal to the prevailing shoulder width. Beyond the shoulder the access profile shall not exceed 8% change within any 3.0 metres distance as shown on Figure 2, Page 19.

5.2 Cross Section and Material

5.2.1 Existing Sidewalks

Where a sidewalk is located across a proposed access and does not meet the applicable District Specifications, it shall be removed and replaced. Where a sidewalk is located close to a curb line, and the access opening is to be provided across a depressed curb, the sidewalk shall be removed and replaced with a concrete sidewalk, ramped to District Specifications, and conforming to the access profile. In special cases (i.e. High Volume Commercial Accesses) where the sidewalk is to be discontinued across the access, the access shall be defined by curbing and a sufficient amount of sidewalk shall be replaced meeting the necessary District wheelchair specifications.

5.2.2 Existing Curbs

Where a depressed curb must be provided or restored, the entire curb and gutter section to the nearest expansion joint shall be removed and replaced to District Specifications. The removal of only the raised portion of the curb will not be allowed, unless an approved grinding or cutting method is employed.

5.2.3 Surfaces

Accesses must be surfaced and maintained to ensure the original profile is retained, that operational speeds are not reduced by pot holes or rough surfaces, and that no damage or deterioration of the highway is caused by the condition of the access.

All accesses shall be surfaced with an asphaltic or concrete material to District Specifications within the limits of the highway, except all non-commercial accesses in locations where no curb and gutter exists. In this case, as a minimum, the access is required to be surfaced with a thickness of gravel or crushed stone to District Specifications.

5.3 Drainage

Accesses must be constructed so that they do not adversely affect the roadway drainage, drainage on adjacent properties, or the drainage or stability of the roadway subgrade. The construction or an access must not cause water to flow across the road pavement, or to pond on the shoulders or in the ditch, or cause erosion within the highway.

5.3.1 Existing Gutter

Where drainage is carried along the curb, the access must be sloped to prevent run-off spillage into private property and the flowline of the gutter through the access shall be maintained.

5.3.2 Existing Ditch

Where an access will cross an open ditch, a culvert pipe shall be installed. The culvert shall be installed such that the invert elevation is compatible with the profile of the existing ditch line. A ditch or gutter shall not be filled without adequate provision for drainage being made.

Culvert pipes shall be of a size adequate to carry the anticipated flow in the ditch as determined by the District. In general the culvert pipe shall not be less than 500 mm inside diameter.

The material and gauge of the culvert pipes shall be adequate to withstand the anticipated vehicular traffic across the access and shall meet District Specifications.

5.4 Sight Distance

The location of an access should provide sufficient sight distance for the motorists on the access and the roadway to perceive potential conflicts and to carry out the actions needed to prevent a collision.

5.4.1 Low Speed Roadways

An access should not be permitted on a low speed roadway where the available "crossing sight distance" does not meet or exceed the minimum standards contained in the latest edition of the Manual entitled "Geometric Design Standards for Canadian Roads And Streets" published by the Roads and Transportation Association of Canada.

"Crossing sight distance" a measure of the distance required to allow a vehicle time to cross or enter the roadway without unduly affecting an approaching vehicle. The crossing time required is dependent upon the perception and reaction time of the crossing motorist, vehicle acceleration time, the width of the roadway, the length of the crossing vehicle and the speed of an approaching vehicle. "Crossing sight distance" requirements are included in Appendix "A", Page 24.

5.4.1.1 Commercial and High Volume Commercial Accesses

Where "crossing sight distance" requirements cannot be satisfied at any point along the frontage of the property to which access must be provided, the construction of an auxiliary lane should be considered.

Where "crossing sight distance" requirements cannot be satisfied in one direction, the prohibition of a turn in that direction should be considered.

Where a property has frontage onto two roadways, and where "crossing sight distance" requirements cannot be satisfied onto one of those roadways access should only be provided onto the roadway where "crossing sight distance" requirements are satisfied.

5.4.2 High Speed Roadways

An access should not be permitted on a high speed roadway where the available "safe sight distance" does not meet or exceed the minimum standards contained in the latest edition of the Ministry of Transportation and Communications "Geometric Design Standards for Ontario Highways".

"Safe sight distance" is a measure of the distance required to allow a vehicle time to enter the roadway and attain the posted speed limit before being overtaken by a vehicle approaching in the same direction. The time required is dependent upon the perception and reaction time of the entering motorist, vehicle acceleration time, the width of the roadway and the speed of an approaching vehicle. "Safe sight distance" requirements are included in Appendix "A", Page 24.

5.4.2.1. Commercial and High Volume Commercial Accesses

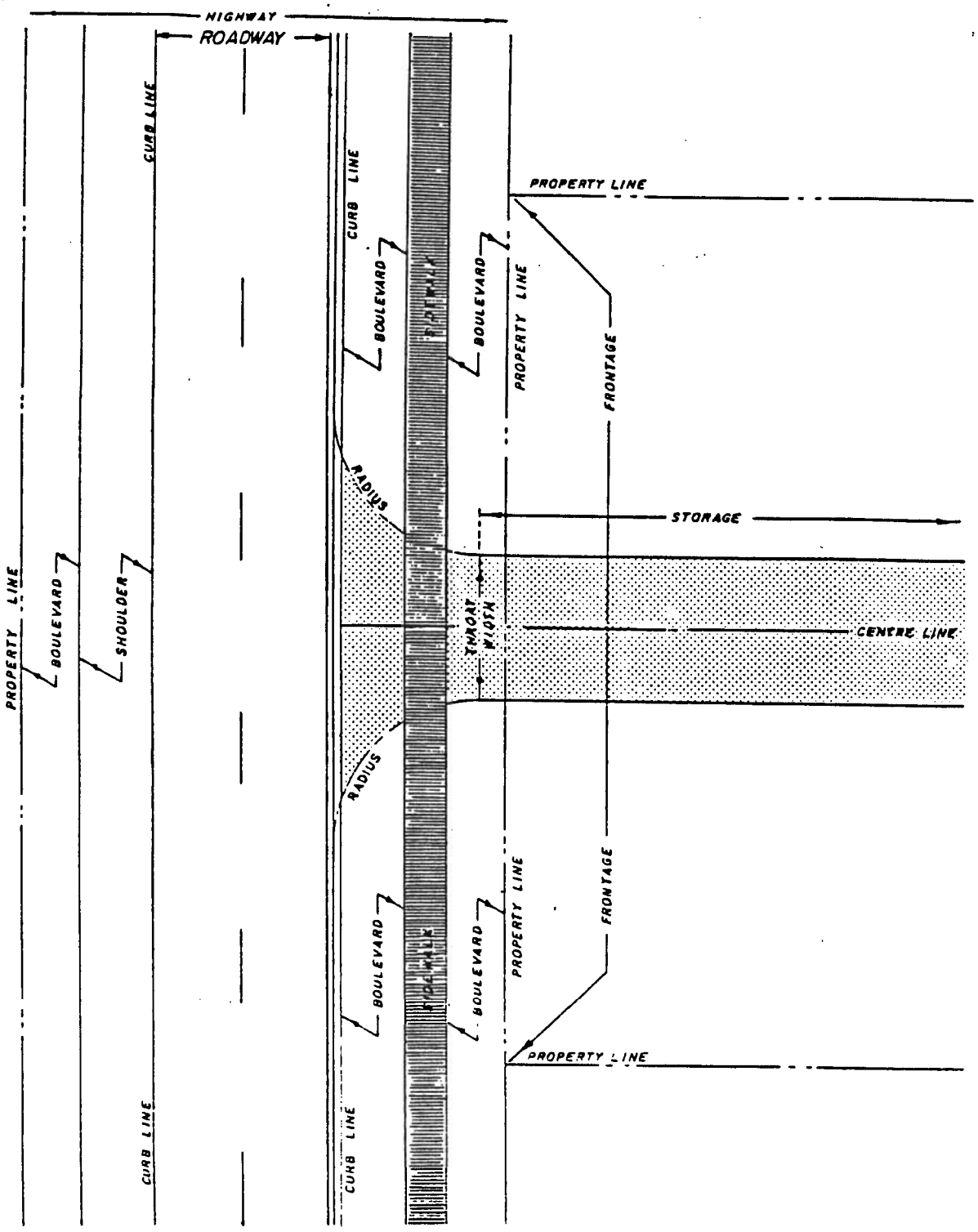
Where "safe sight distance" requirements cannot be satisfied at any point along the frontage of a property to which access must be provided, the construction of an auxiliary lane should be considered.

When a property has frontage onto two roadways and where "safe sight distance" requirements cannot be satisfied onto one of those roadways, access should only be provided onto the roadway where "safe sight distance" requirments are satisfied.

5.4.3. Sight Lines

The applicant must ensure that clear vision is maintained at the mouth of an access and no structure or vegetation is allowed to obscure the vision of an entering or exiting motorist.

F I G U R E S

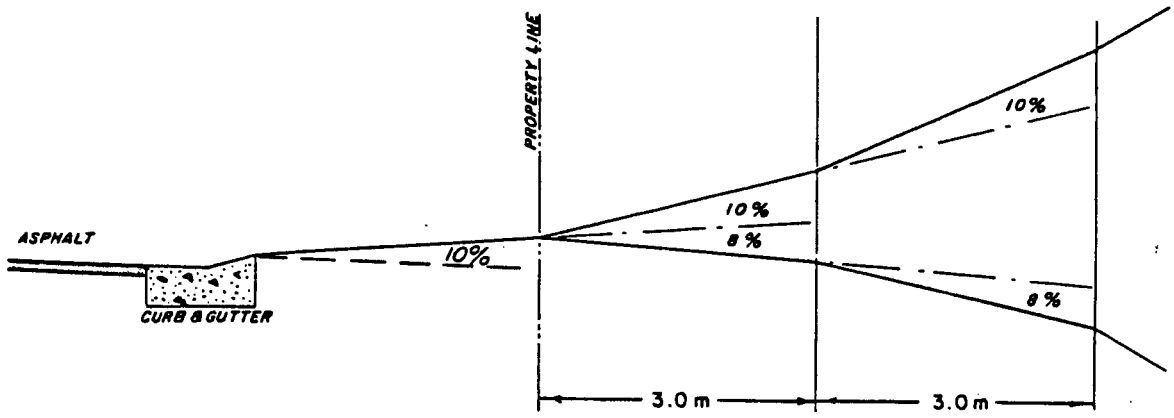


The District Municipality of Muskoka

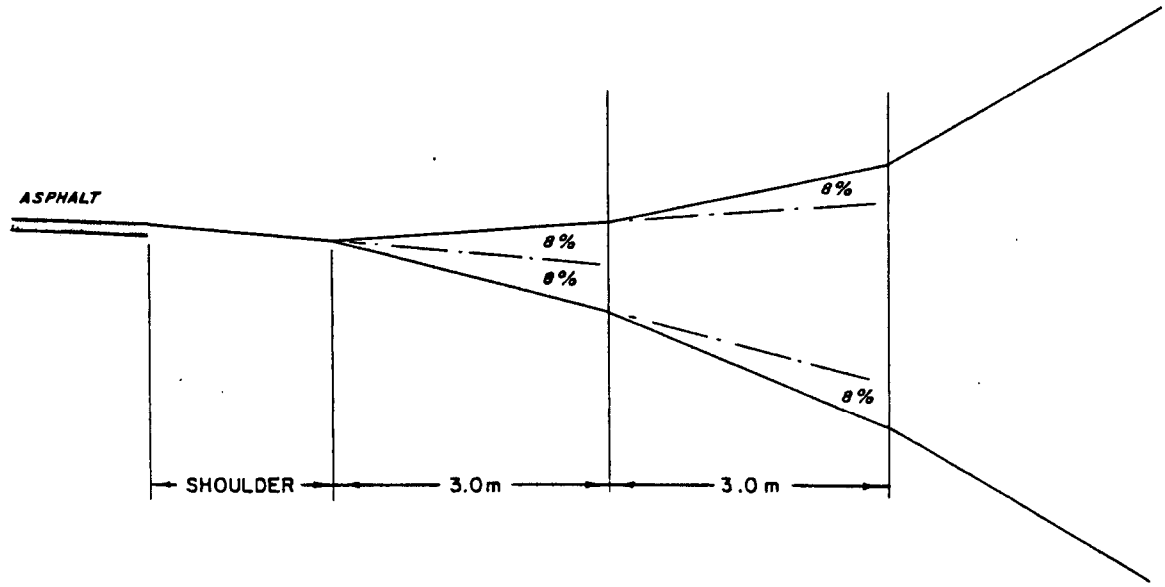
Policy And Procedures For Access Onto District Roads

ILLUSTRATION DEPICTING ACCESS TERMS

FIG. 1



EXISTING GUTTER



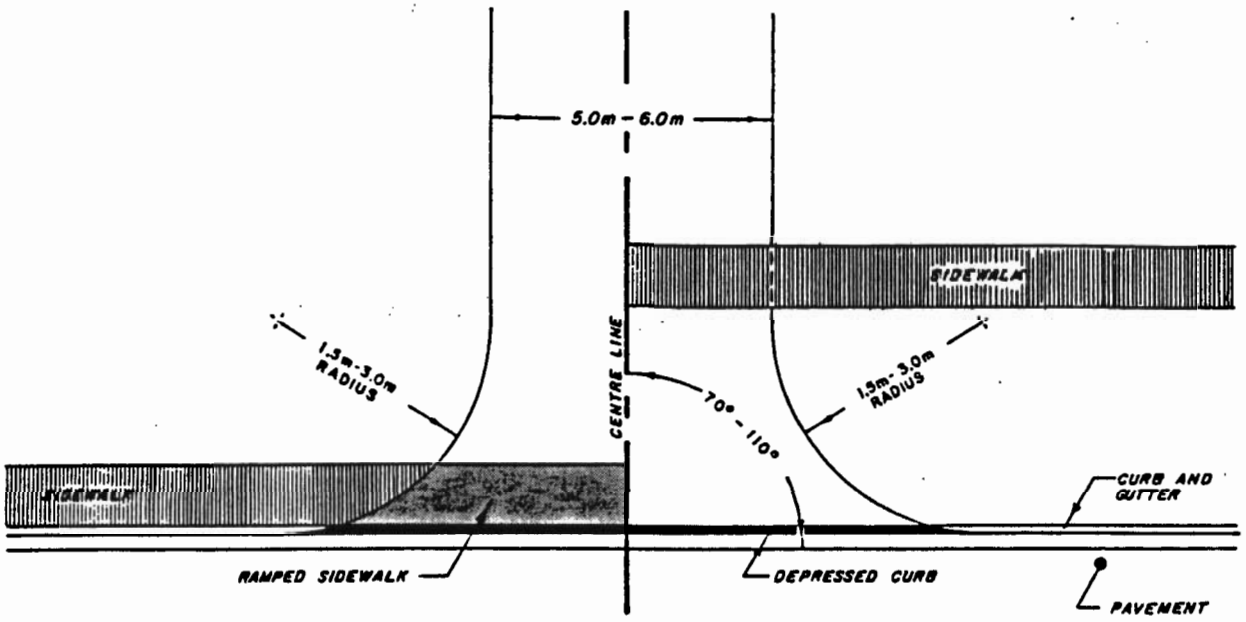
EXISTING DITCH

The District Municipality of Muskoka

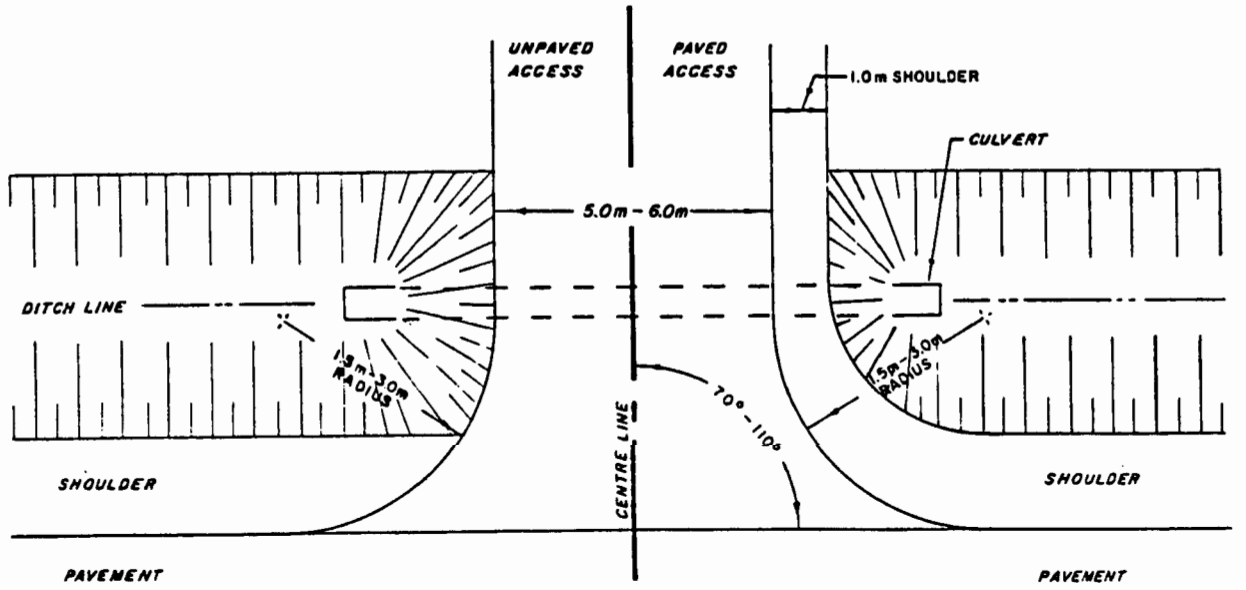
Policy And Procedures For Access Onto District Roads

ACCESS PROFILES

FIG. 2



EXISTING CURB AND GUTTER



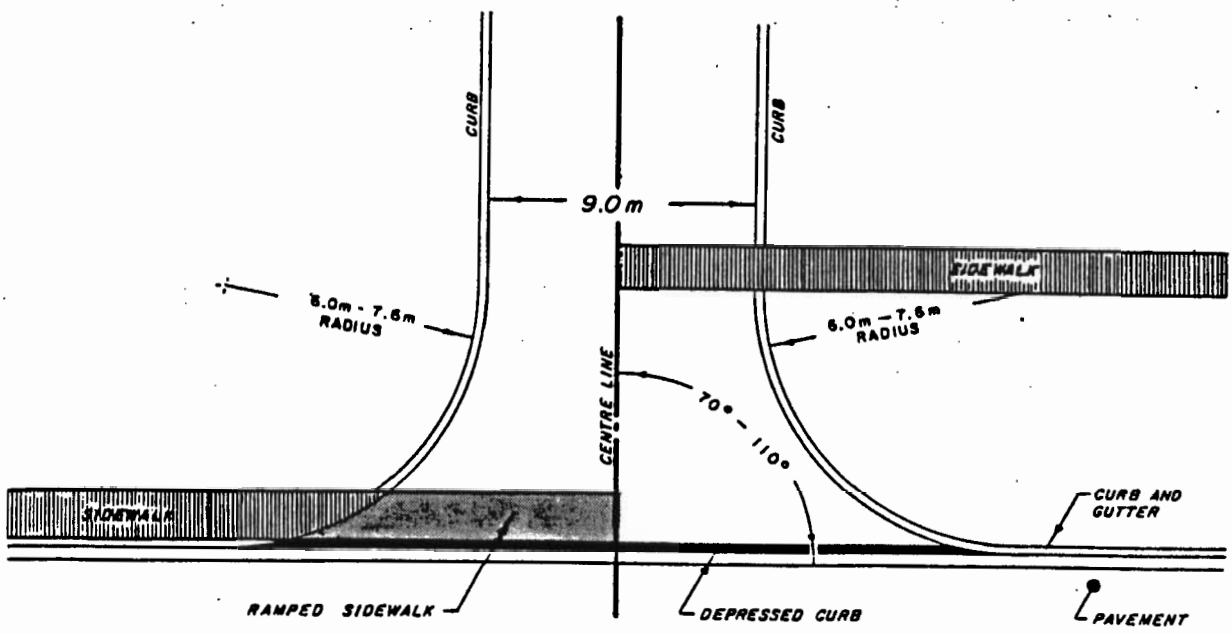
NO CURB AND GUTTER WITH
OPEN DITCH

The District Municipality of Muskoka

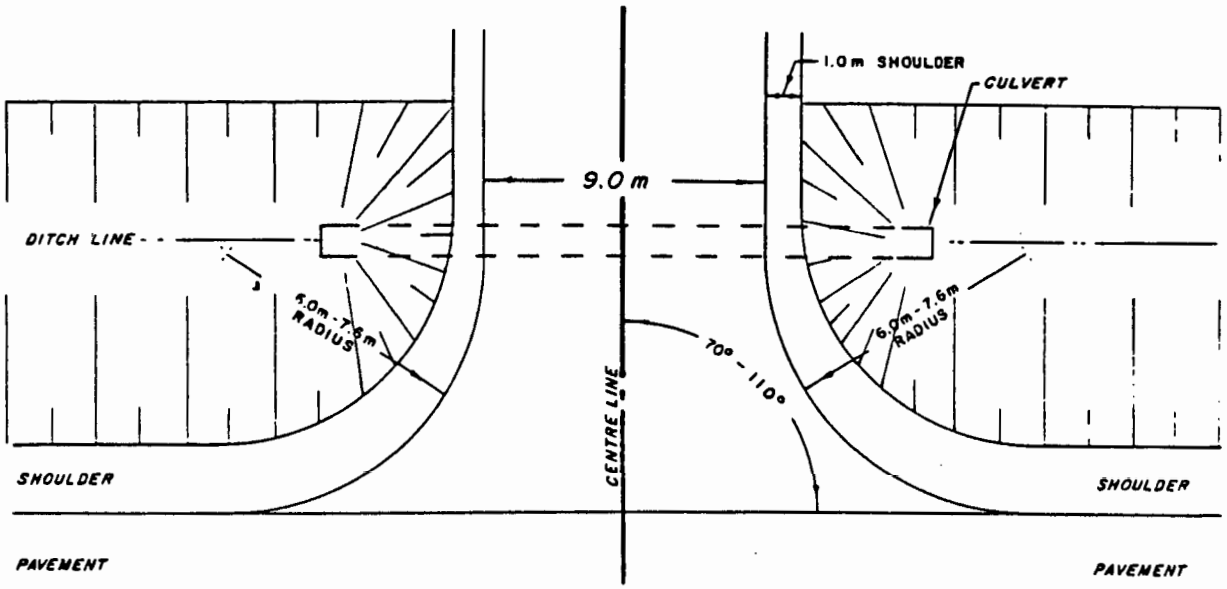
Policy And Procedures For Access Onto District Roads

NON-COMMERCIAL ACCESS REQUIREMENTS

FIG. 3



EXISTING CURB AND GUTTER



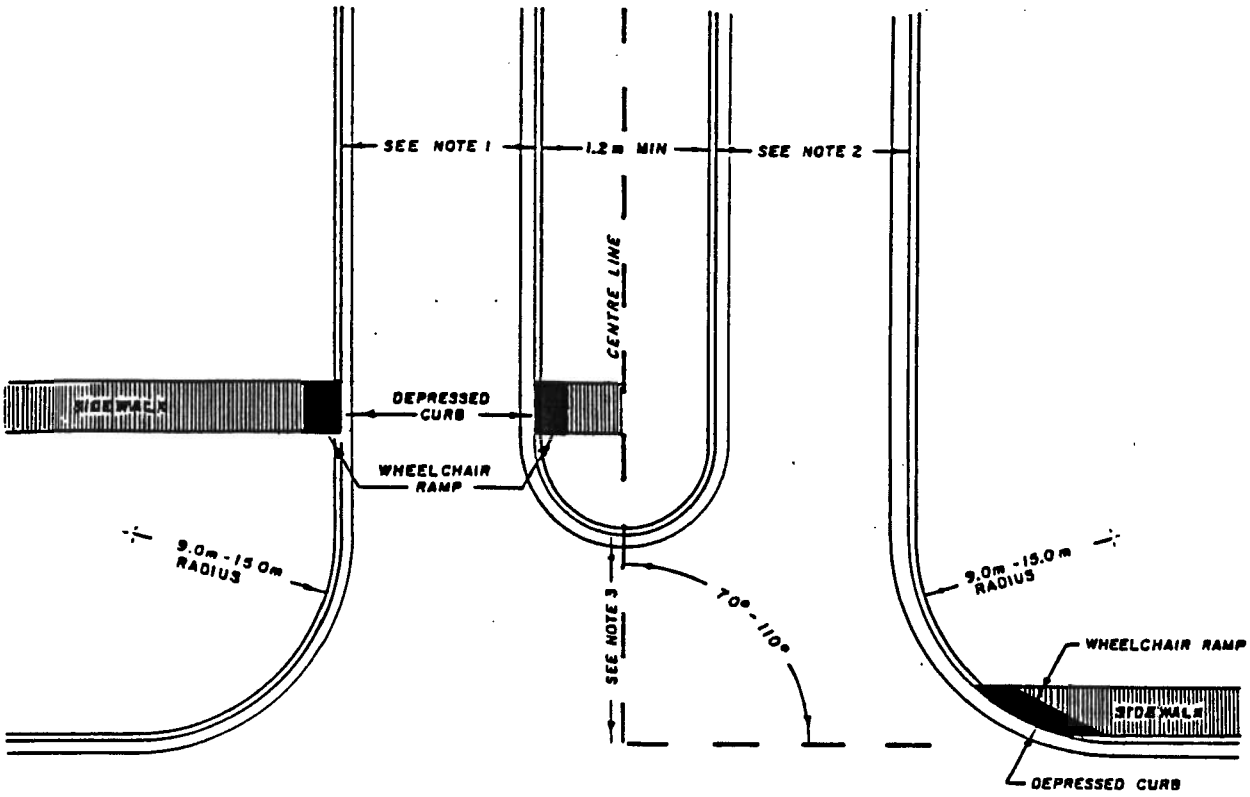
NO CURB AND GUTTER WITH
OPEN DITCH

The District Municipality of Muskoka

Policy And Procedures For Access Onto District Roads

COMMERCIAL ACCESS REQUIREMENTS

FIG. 4



NOTES:

1. THROAT WIDTH VARIES WITH PROJECTED VOLUMES AND TURNING MOVEMENTS;
   - A 3.6 m WIDTH SHALL BE PROVIDED FOR EACH THROUGH LANE AND RIGHT TURN LANE.
   - A 3.0 m WIDTH SHALL BE PROVIDED FOR A LEFT TURN LANE.
2. THROAT WIDTH VARIES WITH PROJECTED VOLUMES AND TURNING MOVEMENTS;
   - A 3.6 m WIDTH SHALL BE PROVIDED FOR EACH LANE.
3. THE POSITION OF THE BULLNOSE SHALL TAKE INTO CONSIDERATION THE TURNING RADIUS OF VEHICLES.

The District Municipality of Muskoka

Policy And Procedures For Access Onto District Roads

HIGH VOLUME COMMERCIAL ACCESS REQUIREMENTS

FIG. 5

APPENDICES

APPENDIX "A"

Sight Distance Requirements (1)

Type of Vehicle	Posted Speed Limit in km/h	Number of Lanes on Roadway	Sight Distance In Metres	
			Non-Commercial	Commercial
Passenger Car	50	2	65	120
	60	2	85	140
	70	2	110	160
	80	2	135	180

(1) Based upon recommendations contained within the Manuals entitled "Geometric Design Standards for Canadian Roads And Streets" published by the Roads And Transportation Association of Canada and "Geometric Design Standards For Ontario Highways" published by the Ministry of Transportation and Communications.

APPENDIX "B"

Layout of Accesses

Access Classification	Roadway Classification	Throat Width	Radius	Angular Placement
Non-Commercial	Low Speed	5m	1.5m min.	70 - 110
	High Speed	6m	3.0m desirable	70 - 110
Commercial (Two Way)	Low Speed	9m	6.0m min	70 - 110
	High Speed	9m	7.6m min	70 - 110
Commercial (One Way)	Low Speed	4.6m	6.0m min	70 - 110
High Volume Commercial	Low Speed	Variable	9.0m-15.0m	70 - 110
	High Speed	Variable	9.0m-15.0m	70 - 110

NOTES:

1. Non-Commercial access requirements are illustrated on Figure 3, Page 20.
2. Commercial access requirements are illustrated on Figure 4, Page 21.
3. High Volume Commercial Access requirements are illustrated on Figure 5, Page 22.

APPENDIX "C"

Number And Location of Accesses

Access Classification	Roadway Clasification	Number of Accesses Allowed (note 1)	Minimum Dimension From Non-Signalized Intersecting Highway (note 2)	Minimum Dimension From Signalized Intersecting Highway (note 2)	Minimum Dimension From Pedestrian Signals (note 3)	Minimum Dimension From Adjacent Non-Commercial Access (note 4)	Minimum Dimension From Adjacent Commercial Access (note 4)	Minimum Dimension From Adjacent High-Volume Commercial Access (note 4)	Minimum Dimension From At Grade Railway Crossing (note 5)	Minimum Dimension From Abutment or Structure on A Highway (note 6)
Non-Commercial	Low Speed	One	16.0m	33.0m	33.0m	7.0m	13.0m	37.0m	8.0m	varies
	High Speed	One	28.0m	55.0m	N/A	8.0m	16.0m	59.0m	8.0m	varies
Commercial	Low Speed	One	33.0m	65.0m	65.0m	13.0m	20.0m	69.0m	13.0m	varies
	High Speed	One	55.0m	110.0m	N/A	16.0m	24.0m	114.0m	13.0m	varies
High Volume Commercial	Low Speed	One	60.0m	120.0m	120.0m	37.0m	69.0m	124.0m	100.0m	varies
	High Speed	One	100.0m	200.0m	N/A	59.0m	114.0m	204.0m	100.0m	varies

NOTES:

1. Need must be demonstrated where multiple accesses are requested. Refer to Section 4.9 Number of Accesses on Page 11.
2. Minimum dimension shall be measured from centreline of access to property line abutting an intersecting highway.
3. Minimum dimension shall be measured from centreline of access to centre of crosswalk.
4. Minimum dimension shall be measured from centreline of access to centreline of adjacent access.
5. Minimum dimension shall be measured from centreline of access to property line abutting railway right-of-way.
6. Minimum sight distance requirements must be satisfied. Refer to Appndix "A", Page 24.

SOURCE: Based upon recommendations contained with the Manuals entitled "Geometric Design Standards For Canadian Roads And Streets" published by the Roads And Transportation Association of Canada and the "Manual of Uniform Traffic Control Devices" for Ontario by the Ministry of Transportation and Communications.

ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION

METRIC
OPSS 577
FEBRUARY 1996

CONSTRUCTION SPECIFICATION FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

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577.01 SCOPE

This specification describes the requirements for the installation, maintenance and removal of erosion and sediment control measures and the removal of sediment accumulated by the control measure.

577.02 REFERENCES

This specification refers to the following standards and publications.

Ontario Provincial Standard Specifications, Construction:

OPSS 206 Grading

Ontario Provincial Standard Specifications, Material:

OPSS 1004 Aggregates - Miscellaneous
OPSS 1801 Corrugated Steel Pipe Products
OPSS 1840 Polyethylene Pipe Products
OPSS 1860 Geotextiles

Canadian General Standards Board:

CAN/CGSB-148.1 M85 - Methods of Testing Geotextiles and Geomembranes

577.03 DEFINITIONS

For the purposes of this specification the following definitions apply.

Earth: means earth as defined in OPSS 206.

Downstream: means downhill and down-gradient.

Inflection point: means the point where a turbidity curtain changes angle to a significant degree.

Upstream: means uphill and up-gradient.

577.05 MATERIAL

577.05.01 Straw Bales

Straw bales shall consist of wheat or oat straw, shall be dry, firm, tightly tied in at least two places, show no evidence of straw or tie decay, and be free of sediment. They shall be of standard agricultural rectangular conformation and dimensions, approximately 600 mm x 600 mm x 1200 mm.

577.05.02 Geosynthetics

577.05.02.01 Geotextile

Geotextile shall conform to the requirements of OPSS 1860. It shall be free of holes, tears, and punctures.

577.05.02.02 Silt Fence Geotextile

Geotextile utilized as silt fence geotextile shall be a woven, Class I geotextile, having a width of 1.0 m minimum. It shall have a filtration opening size (FOS) of 840 μm maximum, meeting CAN/CGSB 148.1, Method 10.2.

577.05.02.03 Temporary Rock Flow Check Geotextile

Geotextile utilized in temporary rock flow checks shall be a woven, Class II geotextile. It shall have a filtration opening size (FOS) of 300 μm maximum, meeting CAN/CGSB 148.1, Method 10.2.

577.05.02.04 Turbidity Curtain Geosynthetic

Turbidity curtain geosynthetics shall have a grab tensile strength of 990 N minimum, meeting CAN/CGSB 148.1, Method 7.3. and be one of geotextile or geomembrane.

Geotextile shall be a woven material. The filtration opening size (FOS) shall be 300 μm maximum, meeting CAN/CGSB 148.1, Method 10.2.

Geomembrane shall be a low-permeability synthetic material or a geotextile impregnated with electomeric spray.

577.05.03 Stakes

Stakes shall be of sufficient strength to satisfy control measure performance and maintenance requirements.

Stakes for light duty sediment barriers and anchoring straw bales shall be a minimum of 1.2 m in length. Stakes for all other control measure applications shall be a minimum of 1.5 m in length.

577.05.04 Control Measure Support Material

Control measure support shall be a separate product, or one bonded to silt fence geotextile; it shall have a minimum sheet width of 750 mm, if in sheet form, and shall provide support for the entire length of the control measure without sagging.

577.05.05 Sandbags

Sandbags shall be made from heavy gauge plastic, agricultural burlap, or silt fence geotextile. Heavy gauge plastic shall contain stabilizers or inhibitors resistant to deterioration by ultra violet radiation. Sandbags shall be approximately 450 mm by 350 mm by 150 mm when filled. Sandbags shall be filled with sands or gravelly sands, containing little or no silt or clay.

577.05.06 Turbidity Curtain Hardware

577.05.06.01 Floatation

Turbidity curtain floatation shall be a material which has sufficient bouyancy to provide the curtain with continuous support, and a minimum of 50 mm freeboard.

577.05.06.02 Load Lines

Turbidity curtain load lines shall be 8 mm steel cable, or 19 mm nylon or polypropylene rope.

577.05.06.03 Ballast

Turbidity curtain ballast shall be 8 mm steel chain.

577.05.06.04 Anchors

Turbidity curtain anchors shall be mushroom or kedge anchors with a minimum mass of 34 kg for firm mud bottoms, or self burying Danforth anchors with a minimum mass of 5 kg for sandy bottoms.

577.05.06.05 Mooring Buoys

Turbidity curtain mooring buoys shall have provision for the mooring line to be securely attached and be sufficiently buoyant to remain afloat under normal load conditions.

577.05.06.06 Mooring Lines

Turbidity curtain mooring lines shall be 19 mm nylon or polypropylene rope.

577.05.06.07 Adjustment Lines

Turbidity curtain adjustment lines shall be 13 mm nylon or polypropylene rope.

577.05.07 Flow Check Rock

Rock utilized in temporary rock flow checks shall conform to the requirements for riprap and gabion stone specified in OPSS 1004.

577.05.08 Chutes

577.05.08.01 Corrugated Pipe

The corrugated pipe chutes shall be metal or plastic,

non-perforated, 300 mm in diameter and shall conform, respectively, to the requirements of OPSS 1801 and OPSS 1840.

577.05.08.02 End Sections

End sections utilized at the inlet and outlet of chutes shall conform to the requirements of OPSS 1801.

577.07 CONSTRUCTION

577.07.01 Operational Constraints

577.07.01.01 Dewatering

Dewatering effluent shall be controlled to prevent passage of sediment into a water body. Discharge of dewatering effluent to dewatering traps shall be controlled to avoid exceeding trap capacity and to limit scour or washout.

577.07.01.02 Chutes

Where chutes are specified, the chute and associated berm barrier shall be constructed in the same day.

577.07.02 Light Duty Sediment Barriers

The work shall consist of the installation, maintenance and removal of light duty sediment barriers.

Light duty sediment barriers are light duty straw bale barriers or light duty silt fence barriers.

Where the contract specifies light duty sediment barriers, the option of selecting either of the light duty sediment barriers or any combination of these control measures shall exist. Where the contract specifies either one of light duty straw bale barriers or silt fence barriers, there shall be no option of substitution for the control measure.

Light duty sediment barriers shall include, at each end of the barrier, a minimum 2 m end-run angled upstream to direct runoff to the main-run of the barrier.

Light duty sediment barriers shall include protection placed against the downstream side, at the low points of the barrier, so that any overflow of the barrier is prevented from causing soil scour and erosion.

Light duty sediment barriers shall be installed and maintained in place without gaps, and without undermining, to prevent sediment passage from the upstream to the downstream side of the barrier.

577.07.02.01 Light Duty Straw Bale Barriers

Light duty straw bale barriers shall be constructed of a single row of anchored straw bales.

Straw bale ties shall not be placed in contact with the ground.

Where straw bale barriers are to be installed on earth surfaces, a trench measuring 750 mm wide by 75 mm deep shall be excavated at the location specified for the barrier. The bales shall be placed in the trench and staked, and the remaining trench space shall be backfilled and compacted to existing grade.

Where straw bale barriers are to be installed on sod, erosion control blanket, or existing turf, they shall be placed and staked so that there are no gaps between the bales and the underlying cover.

The ends of adjacent bales shall be placed tightly against one another without gaps.

Each bale shall be firmly secured in place by two stakes. The stakes shall be spaced 150 mm from each end of the bale. Stakes shall be driven through the bales without breaking the bale ties or otherwise disturbing bale firmness and shape. Stakes shall be driven flush with the top of the bales.

Straw bale barriers shall be maintained such that bales remain firm, intact, of original shape, and without decay.

Maintenance shall include the replacement of each bale at intervals not exceeding 45 days.

577.07.02.02 Light Duty Silt Fence Barriers

Light duty silt fence barriers shall be constructed of silt fence geotextile supported on stakes.

The stakes shall be spaced a maximum of 2.3 m apart, and shall be driven vertically into the ground to a minimum depth of 600 mm.

A trench measuring 200 mm wide by 200 mm deep shall be excavated to anchor the geotextile along its entire length.

The geotextile shall be attached firmly, without sagging, to the upstream side of the stakes, and shall extend into the trench a minimum of 300 mm. It shall be placed without gaps or breaks along its length. Where the geotextile is joined to provide a continuous run, the ends shall be securely fastened and overlapped a minimum of 500 mm.

The trench shall be backfilled and compacted to existing grade to hold the base of the geotextile firmly in place. The completed silt fence shall have a minimum height of 600 mm above the ground surface.

577.07.03 Heavy Duty Sediment Barriers

The work shall consist of the installation, maintenance and removal of heavy duty sediment barriers.

Heavy duty sediment barriers are heavy duty straw bale barriers, heavy duty silt fence barriers, berm barriers, or sandbag barriers.

Where the contract specifies heavy duty sediment barriers, the option of selecting any of the heavy duty sediment barriers or any combination of these control measures shall exist. Where the contract specifies any one of heavy duty straw bale barriers, heavy duty silt fence barriers, berm barriers, or sandbag barriers, there shall be no option of substitution for the control measure.

Heavy duty sediment barriers shall include, at each end of the barrier, a 2 m end-run angled upstream to direct runoff to the main-run of the barrier.

Heavy duty sediment barriers shall include protection placed against the downstream side, at the low points of the barrier, so that any overflow of the barrier is prevented from causing soil scour and erosion.

Heavy duty sediment barriers shall be installed and maintained in place, without gaps, and without undermining, to prevent sediment passage through or under the barrier.

577.07.03.01 Heavy Duty Straw Bale Barriers

Heavy duty straw bale barriers shall be constructed of a light duty straw bale barrier, with the addition of control measure support installed on stakes.

In addition to the requirements for light duty straw bale barriers the following shall apply.

a. The 1.5 m stakes control measure support shall be spaced a maximum of 2 m apart, and shall be driven vertically into the ground to a minimum depth of 900 mm.

b. The control measure support shall be attached on the upstream side of the 1.5 m stakes.

c. The straw bales shall be placed firmly against the upstream side of the control measure support.

577.07.03.02 Heavy Duty Silt Fence Barriers

Heavy duty silt fence barriers shall be constructed of silt fence geotextile and control measure support installed on stakes.

Control measure support shall extend the entire height and length of the installed silt fence, without gaps or breaks. The control measure support shall be attached on the upstream side of 1.5 m stakes.

The requirements for light duty silt fence barriers shall apply with the following exceptions.

a. The geotextile shall be attached to the upstream side of the control measure support.

b. Stakes shall be spaced a maximum of 2 m apart, and be driven into the ground to a minimum depth of 900 mm.

Heavy duty silt fence barriers shall be maintained vertical, without tears and without sagging.

577.07.03.03 Berm Barriers

Berm barriers shall be constructed of earth material placed in windrows to a minimum height of 600 mm above the surface on which they are placed. The upstream slope of the barrier shall be 1.5:1 maximum. The downstream slope of the barrier shall be 4:1 maximum.

Berm barriers shall be maintained at specified height and slope, and without sloughing and slumping.

577.07.03.04 Sandbag Barriers

Sandbag barriers shall be constructed of three layers of sandbags. The bottom layer shall consist of three rows of bags, the middle layer shall consist of two rows of bags, and the top layer shall consist of one row of bags. The bags within each row shall be placed with the sides of the bags butted tightly against one another without gaps. The ends of sandbags in adjacent rows shall be butted tightly against one another without gaps.

The sandbags in each row shall be uniformly staggered to one another. The sandbags in each layer shall uniformly overlap the layer below.

Where sandbag barriers are to be installed on earth surfaces, a trench 75 mm deep, and sufficiently wide to accommodate three sandbags laid end to end, shall be excavated at the location specified for the barrier. The

sandbags shall be placed, and the remaining trench space shall be backfilled and tamped to existing grade.

Where sandbag barriers are to be installed on sod, erosion control blanket, existing turf, or bedrock, they shall be placed so that there are no gaps between the sandbags and the underlying surface.

Sandbag barriers shall be maintained with bags untorn and firmly seated.

577.07.04 Light Duty Channel Flow Checks

The work shall consist of the installation, maintenance and removal of light duty channel flow checks.

Light duty channel flow checks are straw bale flow checks, silt fence flow checks, or sandbag flow checks

Where the contract specifies light duty flow checks, the option of selecting any of the light duty flow checks or any combination of these control measures shall exist. Where the contract specifies any one of straw bale flow checks, silt fence flow checks, or sandbag flow checks, there shall be no option of substitution for the control measure.

Light duty flow checks shall include protection placed against the downstream side, at the lowest point of the flow check, so that any overflow of the flow check is prevented from causing soil scour and erosion.

Light duty channel flow checks shall be installed and maintained in place, without gaps, and without undermining, to prevent sediment passage through or under the flow check.

577.07.04.01 Straw Bale Flow Checks

Straw bale flow checks shall be constructed of a double row of bales. The requirements for light duty straw bale barriers shall apply, with the exception of end-runs and with the addition of the following.

a. Where straw bale flow checks are to be installed on earth surfaces, the trench shall be 1500 mm wide.

b. The two rows of bales shall be butted tightly beside one another without gaps.

c. The bales in the two rows shall be uniformly staggered to one another, so that the ends of the upstream row of bales are adjacent to the centres of the downstream row of bales.

d. The ends of the flow check, at ground level, shall be higher than the top of the lowest point of the flow check.

e. The upstream row of bales shall be one bale longer than the downstream row.

577.07.04.02 Silt Fence Flow Checks

Silt fence flow checks shall be constructed of silt fence geotextile and control measure support installed on stakes.

The requirements for heavy duty silt fence barriers shall apply with the following exceptions and additions.

a. Stakes shall be spaced a maximum of 1 m apart.

b. Stakes shall be placed at the centre of V-shaped ditches and at the point where side slopes meet the bottom of channels and trapezoidal-shaped ditches.

c. The ends of the flow check, at ground level, shall be higher than the top of the lowest point of the flow check.

d. The completed silt fence flow check at its lowest point shall have a height of 375 mm minimum and 500 mm maximum above the ground surface.

e. End runs are not required.

Silt fence flow checks shall be maintained vertical, without tears and without sagging.

577.07.04.03 Sandbag Flow Checks

The requirements for sandbag barriers shall apply, with the following modifications.

a. End-runs are not required.

b. The ends of the flow check, at ground level, shall be higher than the top of the lowest point of the flow check.

577.07.05 Temporary Rock Flow Checks

The work shall consist of the installation, maintenance and removal of rock flow checks.

Rock flow checks shall be constructed of geotextile and two lifts of rock.

A first lift of rock shall be piled across the ditch or channel to a height of 450 mm above the lowest point

of the ditch or channel. The upstream slope of the flow check shall be 1.5:1 maximum. The downstream slope of the flow check shall be 4:1 maximum. The top of the first lift shall be of sufficient width to accommodate the second lift of rock.

A trench measuring 200 mm wide by 200 mm deep shall be excavated across the entire length of the upstream side of the flow check.

Geotextile shall be placed:

a. 300 mm into the trench;

b. over the first lift of rock; and

c. up the side-slopes of the ditch or channel to the fullest extent covered by the completed flow check.

The trench shall be backfilled to existing grade to hold the geotextile firmly in place.

A second lift of rock shall be placed over the exposed geotextile and first lift of rock to form a spillway and anchor the geotextile as follows:

a. The minimum depth of rock over the geotextile shall be 100 mm.

b. The tops of the sides of the completed flow check shall be a minimum of 700 mm above the lowest point of the ditch or channel.

c. A level spillway measuring 150 mm deep shall be formed in the top of the flow check so that it extends from the upstream to the downstream side, and its crest is centred over the lowest portion of the ditch or channel. Where rock flow checks are to be installed in V-shaped ditches, the spillway crest shall extend 300 mm on either side of the centre of the ditch. Where rock flow checks are to be installed in channels or trapezoidal-shaped ditches, the spillway crest shall extend to the greater of the following:

    1. 300 mm on either side of the centre line of the ditch; or

    2. to the point where the side slopes meet the bottom of the channel or ditch.

Rock flow checks shall be installed and maintained in place, without gaps, and without undermining, to prevent sediment passage through or under the flow check.

577.07.06 Excavated Sediment Traps

The work shall consist of the installation, maintenance and removal of excavated sediment traps.

Excavated sediment traps shall be constructed as a single control measure, consisting of an excavated basin and either a light duty channel flow check or temporary rock flow check. The flow check shall be constructed approximately 1 m downstream of the excavated basin.

The excavated basin shall have a minimum depth of 1 m below the existing ground surface as measured at the lowest point of the channel at the downstream end.

The bottom of the excavated basin shall be horizontal, shall have a length measuring 20 m maximum, and shall have a width which is a minimum of one half the length. The sides of the excavated basin shall be no steeper than 0.5 : 1.

A temporary fence shall be erected around the sediment trap to restrict public access.

Excavated sediment traps shall be installed and maintained to prevent sediment passage from the upstream to the downstream side of the excavated trap, and so that the majority of the sediment is collected in the excavated basin.

577.07.07 Chutes

The work shall consist of the installation, maintenance and removal of chutes. The berm barrier constructed in association with the chute is not part of this work.

Chutes shall be constructed as a single control measure, consisting of corrugated pipe, two end sections, and an excavated sediment trap constructed at the outlet end of the pipe.

The pipe inlet shall be placed through a berm barrier in such a manner that flow is directed to the pipe inlet without scouring of the berm. The toe plate of the inlet end section shall be fully imbedded into the ground surface. The inlet end section shall have a minimum grade of 3% towards the pipe opening.

The pipe outlet shall be placed such that the outlet end section discharges into the excavated sediment trap, and so that the toe plate of the outlet end section is fully imbedded into the edge of the trap.

The pipe shall be firmly secured to the slope.

Protection shall be placed below the pipe outlet end section to prevent scour of the excavated trap.

Pipes shall be maintained in place, without gaps, and without undermining, so that water is conveyed from the upstream side of the berm and collected in the sediment trap.

577.07.08 Dewatering Traps

The work shall consist of the installation, maintenance and removal of dewatering traps.

Traps for dewatering shall be constructed as a single control measure, consisting of an excavated basin, surrounded by a light duty sediment barrier, with a temporary rock flow check at the point of water outlet.

The excavated basin shall have a minimum depth of 1 m below the existing ground surface. The bottom of the excavated basin shall have a maximum length and width of 20 m. The sides of the excavated basin shall be no steeper than 0.5 : 1. The shape of the dewatering basin may be varied to suit site characteristics.

The sediment barrier and temporary rock flow check shall be installed a minimum of 1 m from the edges of the excavated basin.

Installation of the sediment barrier shall conform to the requirements for light duty sediment barriers with the following exceptions:

a. end runs are not required; and

b. the temporary rock flow check shall be located at the low point of the barrier.

The spillway height in the temporary rock flow check shall be adjusted so that it is 75 mm lower than the top of the adjacent barrier. The temporary rock flow check shall be constructed at the point where the top of the sediment barrier is lowest. The geotextile used in the flow check shall overlap the light duty sediment barrier a minimum of 500 mm.

Traps for dewatering shall be installed, operated and maintained to prevent sediment passage beyond the perimeter of the trap.

577.07.09 In-Water Controls

The work shall consist of the installation, maintenance and removal of in-water controls, which for the purposes of this specification may be either Turbidity Controls or Coffer Dams.

577.07.09.01 Turbidity Curtains

Turbidity curtains shall consist of turbidity curtain geosynthetic, load line, flotation, ballast, anchors, mooring buoys, mooring lines, adjustment lines, and tie-downs.

Turbidity curtains shall be constructed as follows.

a. A sleeve shall be formed and heat-sealed or sewn along the entire top edge of the turbidity curtain geosynthetic, to contain the floatation and load line in the sleeve. The floatation shall provide support along the length of the turbidity curtain.

b. A sleeve shall be formed and heat-sealed or sewn along the entire bottom edge of the turbidity curtain geosynthetic, to contain the ballast in the sleeve. Breaks may be made in the sleeve to facilitate pulling, provided they are a minimum 100 mm in size and spaced at minimum 3 m intervals.

c. Where turbidity curtain geosynthetic is joined to provide a continuous run, the sections shall be connected to provide a continuous seal and prevent the escape of turbid water between the sections.

d. The turbidity curtain, as prepared for installation, shall be of sufficient width to account for water depth and wave action.

e. Adjustment lines shall be placed at maximum intervals of 10 m, and to encircle the turbidity curtain from top to bottom.

f. The turbidity curtain shall be prepared for installation by furling and tying with furling ties every 1.5 m for the entire length of the curtain.

g. Anchor locations shall be established as is necessary to maintain the turbidity curtain in place and functioning.

Turbidity curtains shall be installed to prevent sediment passage, from the area enclosed by the curtain, to the remaining water body. Turbidity curtains shall be installed and maintained in a manner that avoids entry of equipment, other than hand-held equipment or boats, to the remaining water body. The sequence of installation is as follows:

a. Tie-downs shall be provided to firmly anchor the turbidity curtain to the shoreline at locations specified.

b. One end of the furled curtain shall be firmly attached to the upstream or up-current tie-down.

c. The furled curtain shall be launched and shall be placed as specified.

d. The remaining end of the furled curtain shall be attached to the downstream or down-current tie-down.

e. Each anchor shall be attached to the turbidity curtain load line with a mooring line.

f. At inflection points, mooring buoys shall be attached to the mooring line at a distance of 1 m from the load line.

g. The furling ties shall be released to allow the turbidity curtain ballast to sink to its maximum depth.

h. The location and depth of the ballast shall be adjusted as necessary by using the adjustment lines.

Equipment is permitted in the work area enclosed by the turbidity curtain.

Turbidity curtains shall be operated and maintained in the specified location, with the entire top edge above the water surface. The curtain shall be free of tears and gaps, and the bottom edge of the curtain is to be continuously in contact with the water course bed so that sediment passage from the area enclosed is prevented.

Any folds in the turbidity curtain which form next to the floatation collar shall be regularly monitored and freed of collected sediment.

577.07.09.02 Coffer Dams

Coffer dams shall be installed and maintained in a manner that:

a. isolates the work area from the water body;

b. avoids entry of equipment, other than hand-held equipment or boats, to the remaining water body; and

c. prevents release of sediment and debris to the water body.

Equipment is permitted in the work area enclosed by the coffer dam.

577.07.10 Monitoring

To ensure that erosion and sediment control measures are in effective working order, their condition shall be monitored prior to any forecast storm event and following a storm event.

577.07.11 Maintenance

All measures installed under the terms and conditions of this specification are to be maintained in an effective, functioning and stable condition.

577.07.12 Sediment Removal

The work shall consist of the removal and management of accumulated sediment.

Sediment that is accumulated by sediment barriers, channel flow checks, excavated traps, sediment interceptors, and dewatering traps, shall be removed in a manner that avoids escape to the downstream side of the control measure and avoids damage to the control measure. Sediment shall be removed to the level of the grade existing at the time of the control measure installation and shall conform to the following:

a. For light duty sediment barriers and light duty channel flow checks, accumulated sediment shall be removed once it reaches the lesser of:

   1. a depth of one-half the effective height of the control measure, which for channel flow checks, shall be determined relative to the lowest point of the flow check; or

   2. a depth of 300 mm immediately upstream of the control measure.

b. For heavy duty sediment barriers, heavy duty channel flow checks, excavated traps, sediment interceptors, and dewatering traps, accumulated sediment shall be removed once it reaches one-half the effective height or depth of the control measure.

c. For all control measures, accumulated sediment shall be removed as necessary to perform maintenance repairs.

d. Accumulated sediment shall be removed immediately prior to the removal of the control measure.

Sediment removed shall be managed as excess earth material.

577.07.13 Control Measure Removal

Ditch, channel, permanent slope, and any other embankment cover specified elsewhere in the contract to be placed within the area controlled by the temporary erosion and sediment control measure, shall be in place prior to the removal of such temporary control measure.

Temporary erosion and sedimentation control measures shall be removed and associated excavations backfilled and compacted when, in the opinion of the Contract Administrator, the measures are no longer required.

Erosion and sedimentation control measures shall be removed in a manner that:

a. avoids entry of equipment, other than hand-held equipment or boats, to any watercourse; and

b. prevents release of sediment and debris to any watercourse.

Prior to removal, the area enclosed by turbidity curtains and coffer dams shall be cleaned of all debris, and for coffer dams, accumulated sediment shall be removed.

Any seeding and mulching, temporary cover, sodding, other surface application, or original turf cover disturbed by removal or backfilling of erosion and sedimentation control measures and removal of accumulated sediment, shall be brought to final grade and restored.

577.09 MEASUREMENT FOR PAYMENT

577.09.01 Actual Measurement

577.09.01.01 Light Duty Sediment Barriers
Light Duty Straw Bale Barriers
Light Duty Silt Fence Barriers
Heavy Duty Sediment Barriers
Heavy Duty Straw Bale Barriers
Heavy Duty Silt Fence Barriers
Berm Barriers
Sandbag Barriers

Measurement will be by the metre of barrier installed, from end to end, following the contours of the ground.

577.09.01.02 Light Duty Channel Flow Checks
Straw Bale Flow Checks
Silt Fence Flow Checks
Sandbag Flow Checks
Temporary Rock Flow Checks

For measurement purposes a count will be made of the flow checks installed.

577.09.01.03 Excavated Sediment Traps
Chutes
Dewatering Traps

For measurement purposes a count will be made of the excavated sediment traps, chutes, and dewatering traps installed. Component parts will not be counted separately for payment.

577.09.01.04 Turbidity Curtains
Coffer Dams

For measurement purposes a count will be made of the Turbity Curtains and Coffer Dams installed, by location.

577.09.01.05 Sediment Removal

Measurement will either be by the volume of sediment excavated in cubic meters, or by the number of hours required for excavation of sediment, as specified in the Contract.

577.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement will be based on the units shown in the clauses under Actual Measurement.

577.10 BASIS OF PAYMENT

577.10.01 **Light Duty Sediment Barriers - Item**
Light Duty Straw Bale Barriers - Item
Light Duty Silt Fence Barriers - Item
Heavy Duty Sediment Barriers - Item
Heavy Duty Straw Bale Barriers - Item
Heavy Duty Silt Fence Barriers - Item
Berm Barriers - Item
Sandbag Barriers - Item
Light Duty Channel Flow Checks - Item
Straw Bale Flow Checks - Item
Silt Fence Flow Checks - Item
Sandbag Flow Checks - Item
Temporary Rock Flow Checks - Item
Excavated Sediment Traps - Item
Chutes - Item
Dewatering Traps - Item
Turbidity Curtains - Item
Coffer Dams - Item

Payment at the contract price for the above tender items shall be full compensation for all labour, equipment and material required to do the work. Partial payments will be made on the following basis:

a. 50% for initial installation;

b. 30% for maintenance, and

c. 20% for removal.

Payment for the item Coffer Dams shall be in addition to dewatering requirements which may be specified elsewhere in the Contract.

577.10.02 **Sediment Removal - Item**

Where the contract provides a tender item for sediment removal, payment at the contract price shall be full compensation for all labour, equipment and material to perform the work.

Where the contract does not provide quantities in support of sediment removal, and where sediment removal is directed to be performed, payment shall be made according to Extra Work provisions of the contract.