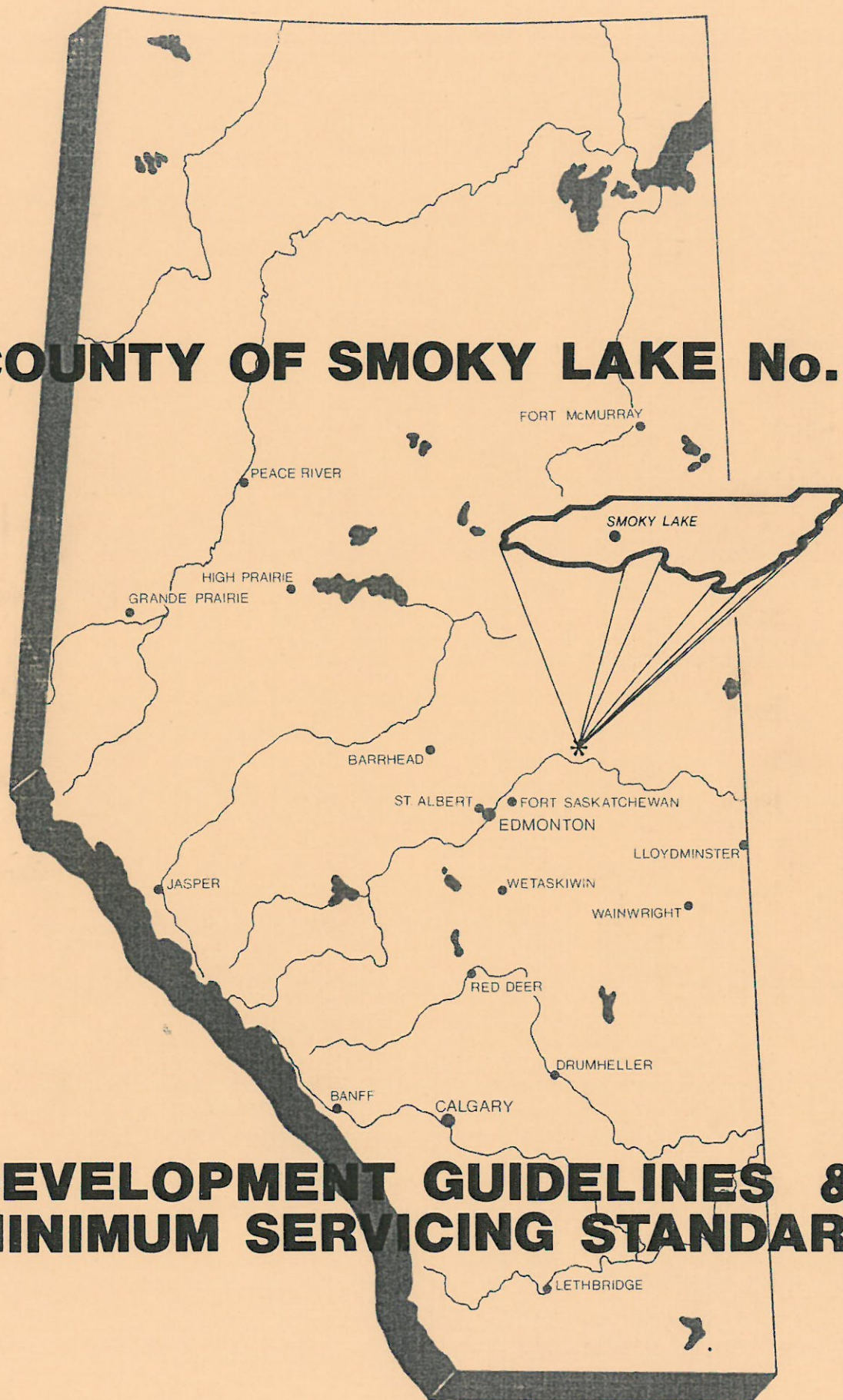


COUNTY OF SMOKY LAKE No. 13



DEVELOPMENT GUIDELINES & MINIMUM SERVICING STANDARDS



STEWART, WEIR & Co.

DEVELOPMENT GUIDELINES
AND
MINIMUM SERVICING STANDARDS
FOR
COUNTRY RESIDENTIAL SUBDIVISIONS

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PART I

ADMINISTRATION

1. General

These servicing standards and guidelines are the minimum development requirements ascertained by the municipality pursuant to Section 89 of the Planning Act.

It is the Developer's responsibility to satisfy, in addition to these requirements, all regulations and conditions required by the Planning Act, Provincial Government Authorities and the Planning Authorities.

2. Definitions and Interpretations

- i) Municipality - shall mean County of Smoky Lake No. 13.
- ii) Council - shall mean persons duly elected to Council of the Municipality.
- iii) Development Officer - shall mean person or persons appointed and acting on behalf of Municipality to regulate the orderly development of subdivisions and properties.
- iv) Engineer - shall mean Municipal Engineer or an Engineer designated by the Municipality.
- v) Developer - shall mean such person or persons developing a subdivision or subdividing land, or an owner or owners of land, or their employee, agent or representative.
- vi) Rural Development - shall mean development of low density, low level of service, located in a rural setting.
- vii) Development Agreement - shall mean documents outlining the general requirements and conditions of which the Developer enters into agreement with the Municipality prior to construction and installation of municipal services in the development.
- viii) Development Permit - shall mean such authorization as issued by the Municipality to the Developer to proceed with construction and installation of municipal services in the development.

- ix) Building Permit - shall mean such authorization as issued by the Municipality to proceed with building construction on a particular lot.
- x) Municipal Planning Committee or Designate - shall mean a committee formed by the Municipality to review all subdivision or development applications and make recommendations to Council.

3. Developers Responsibility

i) Roads & Drainage

- (1) The "Developer" shall be responsible for the construction of Road Grades, Entrances, Light Hard Surfacing, Signs, Landscaping, Buffers, and Drainage Works, which are required for the development of the Subdivision including Connecting Roads and Service Roads.
- (2) The Road Grades, Entrances, Light Hard Surfaces, Signs, Landscaping, Buffers & Drainage Works, Connecting Roads and Service Roads shall be constructed to the specification enclosed and/or to such standards as may be directed by the Engineer.
- (3) The supply of all materials required for such work shall be according to specifications or standards set out by the Engineer.
- (4) All costs incurred in the development of the Subdivision shall be at the sole expense of the Developer.

ii) Utilities

- (1) The Developer shall be responsible for the bringing of Power, Natural Gas and Telephone Service into the Subdivision development.
- (2) Any other Utilities that may be required by the Council will be provided at the sole expense of the Developer.
- (3) The Developer of a proposed subdivision is solely responsible for all arrangements with utility companies or oil companies as to the locating and moving of all utilities such as power poles, pipelines, telephone poles, and buried telephone cables, etc., and all expense involved in the process or damage done to utilities during road or drainage construction.

iii) Rights of Way

- (1) All Subdivision Roads shall have a minimum width of 30m.
- (2) If additional Rights of Way are required then, the Municipality shall purchase or acquire from the Developer of a proposed subdivision additional right-of-way widening for Municipality road allowances in the following circumstances:
 - (a) Any widening that the Council deems necessary for the construction or reconstruction of a local road that is paralleling a proposed subdivision.
 - (b) On road allowances which are designated Secondary Roads the additional rights of way will be as outlined in Plate 2.
- (3) At the request of Council the Developer shall provide and dedicate the necessary lands required for a service road in addition to the lands the Municipality may purchase for road widening.
- (4) The Developer shall provide any Right of Way required for easements or utility lots in connection with drainage ditches or other utilities. (See easement specimen.)
- (5) When construction extends beyond the normal right of way boundary extra right of way shall be provided unless special written arrangement has been made with adjoining owner by the Developer.
- (6) The Developer is to provide a buffer strip along the government road allowance, or arterial roads within the subdivision, to control direct access onto a public thoroughfare from lots created by the subdivision of land, to eliminate to some degree traffic noise level and to attain seclusion and privacy within a subdivision.

These Buffers shall be landscaped if required and dedicated at no expense to the Municipality.

Direct access onto a public thoroughfare from an isolated lot within a subdivision will be considered by the Council if application for such is made by the Developer.

- (7) If a subdivision is located adjacent to a road allowance which is designated as part of the secondary road system, the Council may require that the lots and the internal road access points of the subdivision be served by means of a service road parallel to the secondary road in question.

It shall be the Developer's responsibility to construct all entrances and service roads to these specifications or such standards that may be directed by the Engineer.

iv) Engineering, Inspections and Consulting Expenses

- (1) All design, engineering, inspection and consulting will be done by the Engineer.
- (2) The Developer may be required to supply the Engineer with a detailed contour plan of the subdivision development.
- (3) The Engineer shall supply the Developer with design plans, profiles, specifications and necessary construction stakes, but this does not include the supervision of the contract.
- (4) All costs incurred by the Municipality for Engineering, Consulting and/or Inspection services in carrying out all conditions and regulations contained herein shall be the responsibility of the Developer.

4. Acquisition of Lands for Municipal Services

The Developer is responsible, at his own cost and expense, for acquiring lands where required which are outside the boundaries of his development.

All easements which are attributable to the proposed development shall be registered in the name of the Municipality and the costs incurred in negotiating, preparing and executing the respective easements shall be borne by the Developer.

Land Acquisition:

- i) The Municipality shall carry out all negotiations with respective land owners for the purchase of lands or easement agreements or any other agreements pertaining to utility right-of-way.

- ii) Prior to commencing any negotiations, the Municipality will require that the Developer enters into a Development Agreement with the Municipality for the proposed Development. Upon execution of the Agreement, the Developer should thereby agree to be responsible for all land costs, the acquisition costs, the costs of relocating or repairing fences and any other costs which are required in the initial negotiation.
- iii) The Municipality shall assign their Landman, or engage a Landman to carry out negotiations with property owners. These negotiations shall be pursued and continued until a final agreement is reached. The Landman shall keep the Municipality and the Developer informed of his progress on the matter.
- iv) The Developer, subject to the terms and conditions of the Development Agreement shall be bound to all the terms and conditions negotiated on behalf of his Development by the Municipality.
- v) Should the Municipality be unsuccessfully in acquiring the lands or reaching an agreement with the property owners, the Developer shall be required to come up with an alternative solution for his Development.

In any event, should negotiations for land acquisition by the Municipality on behalf of the Developer fail, the Developer is still responsible for the costs of these negotiations and for which costs he shall promptly reimburse the Municipality.

5. Subdivision Application

The Municipality may, if necessary, form a Municipal Planning Committee to review all subdivision or development applications. This committee would be formed solely for the purpose to advise and to keep the municipal council well informed on developments of any particular application.

6. Development Agreement

- i) The Developer shall enter into a Development Agreement with the Municipality prior to the construction and installation of local improvements and utilities in the subdivision.
- ii) There shall be no Building Permit issued for any construction on a particular lot within the Development until all local improvements and utilities are in place and accepted by the Municipality.

7. Maintenance and Warranty Period

- i) The Developer shall for a period of two years after the acceptance of a Completion Certificate for a Development by the Municipality be responsible for any and all repairs and replacements to any local improvements and utilities which in the opinion of the Municipality become necessary for any cause whatsoever.
- ii) The Developer shall provide for the duration of the Maintenance and Warranty Period an Irrevocable Letter of Credit as required by the Municipality.

8. Final Inspections and Acceptance

- i) Upon completion of all servicing requirements, the Developer shall give notice to the Municipality and arrange for an Inspection.
- ii) Upon completion of the inspection, a deficiency list shall be prepared by the municipal Engineer and forwarded through the Development Officer to the Developer.
- iii) All deficiencies shall be rectified to the satisfaction of the Municipality prior to the acceptance of municipal services.

9. Payments to the Municipality prior to the Registration of Subdivision Plan (SUBJECT TO CHANGE WITHOUT NOTICE)

<u>Payment to Cover</u>	<u>Amount</u>
i) Offsite expenses including Municipal and/or Environmental Reserve lots, but excluding buffer strips.	\$ _____ per parcel
ii) Light-hard surfacing	\$ _____ per lin.m.
iii) Other payments as may be required in the Development Agreement.	\$ _____

NOTE: The above levies only pertain to Country Residential Subdivisions.

PART II

GUIDELINES FOR GENERAL COMPLIANCE

1. General

The materials outlined herein are intended to ascertain minimum servicing standards and guidelines for the development of subdivision.

These guidelines shall not limit the Municipality from setting a higher servicing standard where, in the opinion of the Council, circumstances warrant deviation from these minimum requirements.

The Developer shall also satisfy all regulations and conditions required by the Planning Act, Provincial Government Authorities and the Planning Authorities.

2. Submission of Plan

The Developer shall submit a report outlining the nature of the development, on-site and off-site conditions, surficial geology, topography, drainage courses, ground water levels and any other matters affecting the planning and design of the subdivision. Other information, such as conditions of approval by the various government agencies shall be made available to the Engineer.

Plans and specifications for review as to General Compliance shall be submitted to the Municipality in triplicate.

A construction schedule shall be submitted to the Engineer prior to construction.

Certified copies of all test reports shall be submitted for review and kept current.

3. Other Approvals

The Developer shall obtain all necessary approvals on behalf of the Municipality from various regulatory authorities.

It is the Developer's responsibility to obtain permissions from the utility companies prior to any construction over high pressure pipelines.

4. Final Inspection

Upon completion of the project, the Developer shall notify the Engineer of the completion and request inspection. As-built information shall be submitted for review at this

time. Upon determination that the materials meet requirements, inspection will be carried out. The Developer shall ensure that necessary assistance and equipment are available to facilitate this inspection.

5. As-built Information

The Developer shall submit a set of sepia prints of as-built drawings to the Engineer for review. Information shall include the as-built grades of all improvements, the materials being used, and a complete set of test reports.

6. Road Closures

The Developer shall obtain permissions from the Municipality and all other local authorities forty-eight (48) hours prior to the closing of any existing streets and roads within the Municipality.

7. Road Crossings

Existing roads affected by the proposed development shall be restored to their original standard or to the standard of the proposed development.

8. Utility Crossings

All utility crossings shall be approved by the utility companies prior to the commencement of construction.

9. Railway Crossings

The Developer shall submit an application and a crossing plan to the railway authority should any construction affect the existing crossing.

10. Approval of Materials

All materials used in the construction of the subdivision shall be suitable for their intended use. Any material deviated from the original specifications shall be approved by the Engineer.

11. Right-Of-Way

The Developer shall provide adequate right-of-way for the construction of roads, utilities and drainages. Where construction extends beyond the normal right-of-way extra width shall be provided unless an agreement has been made with adjoining landowner by the Developer.

The Council may require the Developer to dedicate additional lands for road widening of existing Municipal roads.

The Developer may be required by the Municipality to provide a buffer strip parallel to any government road allowance or arterial road to control direct access onto the main thoroughfare from the lots. The minimum width of the buffer shall be six (6) meters.

The Developer may be required by the Municipality to provide and dedicate sufficient lands for the construction of service road, should a subdivision be located adjacent to a Secondary Road or Highway.

Proposed utility right-of-way widths shall be approved by the utility companies and the Engineer.

12. Suitability of Lots For Development

The Municipality will require that each "COUNTRY RESIDENTIAL" Lot shall have adequate developable area for a building site.

The Developer shall therefore, prior to the registration of Subdivision Plan, identify on a separate plan a suitable Building Site and Sewage Disposal Ground on each proposed lot.

The Building site shall always be located on lands classified as DEVELOPABLE.

Developable lands shall be identified as those areas which lie a minimum of two (2) meters above the ground water table.

The lands which have a water table less than two (2) meters below the ground surface will not be considered as Developable, unless the Developer can satisfactorily fill the area and achieve the water table clearance necessary to change the classification to Developable. This type of approach to reclassify land will require prior approval of the Municipality.

The ground water table, if less than two (2) meters below the ground surface, shall be located by hydrogeological survey.

Each lot shall have tests performed for water table levels and percolations.

When the tests are completed the Developer shall show on a separate plan the following:-

- i) the area of land within a proposed lot which is classified as developable,

- ii) in percentages the relationship of Developable land to the rest of the lot area,
- iii) the relationship in elevation difference between the proposed Building Site and Sewage Disposal Site,
- iv) the permeability or percolation of the soils at the proposed Sewage Disposal site.

Each subdivided lot shall be assessed on its own merits, but under all circumstances any particular lot shall meet the following requirements which are considered to be the absolute minimums.

Size of Lot		Minimum Required Developable Area		Minimum Requirement
Acres	Hectares	Acres	Hectares	(in Percentage)
0.50	0.20	0.50	0.20	100%
1.00	0.40	0.75	0.30	75%
2.00	0.81	1.00	0.40	50%
3.00	1.21	1.50	0.60	50%
5.00	2.02	2.00	0.81	40%
10.00	4.05	4.00	1.62	40%
20.00	8.09	6.00	2.43	30%

The land designated as Developable shall be centrally located on a lot, preferably near the front for easy access. Long thin slivers of land which cannot be effectively built on will not be classified as Developable. Ideally speaking, the Developable Lands are to be in one piece and centrally located on a lot.

13. Landscaping and Seeding

All seeding and landscaping shall be at the sole expense of the Developer.

The Developer is responsible for placing topsoil on the backslopes, sideslopes, drainage channels and road ditches and any other necessary preparation prior to seeding.

All seeding is to be done by the developer of roadsides, slopes, ditches, and any disturbed areas such as borrow

or waste areas. The Municipality may undertake to seed Developments and the Developer will be billed by the Municipality for all expenses incurred.

14. Traffic Signs

The Developer shall supply and install all traffic control signs as directed by the Municipality.

All signs shall conform to the standards as recommended by the Council on Uniform Traffic Control Devices for Canada - 1976.

15. Maintenance and Warranty

The Developer shall for a period of two years after the acceptance of the work by the Municipality be responsible for any and all repairs and replacements to any municipal services and utilities which may in the opinion of the Municipality become necessary for any cause whatsoever.

The Engineer will, prior to the end of the two year maintenance and warranty period, conduct an inspection to determine if the Developer has properly maintained the utilities and services.

The two year maintenance and warranty period will not end until the utilities and services which need to be rectified have been completed to the satisfaction of the Municipality.

16. Plan Standards

All engineering plans and drawings submitted to the Municipality for review and approval must comply with the following requirements:

- i) Standard plan size shall be 841 mm X 594 mm. (S.I. A1)
- ii) The topography plan shall indicate the existing contours at 0.5 m interval for urban developments, 2 metre interval for rural country residential, 1 metre for rural industrial.
- iii) The Drainage plan shall indicate the overall surface drainage patterns of the development, and photo enlargement of current conditions.

Scale 1:2000

iv) The site plan shall indicate the General layouts of the subdivision.

Scale 1:2000

v) The utilities plan shall indicate the alignments, locations, types and sizes of the utilities.

Scale 1:1000

vi) The Municipal services plan shall indicate the alignments, locations, types and sizes of the underground municipal services, and traffic control facilities.

Scale 1:1000

vii) The Detailed plans and profile shall indicate the road profiles, underground profiles, grades and elevations, detailed site plans and all other pertinent information necessary for the construction of these municipal services and improvements.

Scale:

Horiz. 1:2000

Vert. 1:50

Plan 1:2000

TABLE 16 - STANDARD DRAWINGS

Rural	
Residential	Industrial
1. Topography	1. Overall Site Plan
2. Overall Drainage	2. Topography
3. Overall Site Plan	3. Overall Drainage Plan
4. Plan showing Building sites and sewage disposal grounds	4. Utilities Plan
5. Detailed Plan and Profiles	5. Overall Municipal Services such as water, storm and sanitary (if required)
	6. Detailed Plans and Profiles

17. Permanent Bench Marks

The Developer shall supply and erect one permanent bench mark within or adjacent to a multiple lot subdivision where a subdivision covers more than one-quarter section of land, a bench mark shall be provided for each quarter section and fraction thereof. This permanent bench mark shall be tied into the nearest geodetic datum (ASCM) and shall be protected against disturbances during the subdivision construction. The location of the bench mark and the elevation shall be established by a registered Land Surveyor and shall be shown on the as-built drawings. The permanent bench mark shall be protected by a marker post. The type of bench mark and method of installation shall be in accordance with the attached drawing.

PART III - RECOMMENDED STANDARDS

RESIDENTIAL SUBDIVISION - RURAL STANDARD

1. Road Works

1.1 The construction of subdivision roads shall include the installation of individual lot entrance. The Municipality may require, upon the recommendation of the Engineer, the Developer to provide improvement of existing Municipal road in conjunction with the proposed subdivision.

Country residential subdivision shall be provided with gravelled roadway.

1.2 Classification

The following classes of roadways are equivalent to the classifications used by Roads and Transportation Association of Canada (RTAC).

	<u>RTAC Classification</u>
(a) Subdivision Cul-de-Sac (less than 100 m)	RLU 50
(b) Subdivision Minor Collector	RCU 60
(c) Subdivision Major Collector	RCU 80
(d) Gov't Road Allowance (minor collector)	RCU 80
(e) Gov't Road Allowance (major collector)	RCU 80
(f) Secondary Road	RAU 100

1.3 Cross-Section Elements

The cross-section elements of the roadways shall conform to the appended illustrations.

1.4 Gradient

The grades at intersection shall not exceed 2% for a minimum distance of 30 metres.

Allowable maximum road grades shall not exceed:-

- (a) 7.0% for internal subdivision roads,
- (b) 7.5% for internal subdivision roads with no access permitted,

(c) 7.5% for the Government Road Allowance, with no access permitted.

The minimum grade shall not be less than 0.5%.

1.5 Embankment Slope

Sideslopes and backslopes shall not be steeper than 3:1. Where, in the opinion of the Engineer, such slopes are not sufficient for the native soil condition, the Developer shall provide a suitable slope satisfactory to the Engineer.

1.6 Subgrade Compaction

The subgrade shall be compacted to a minimum of 95 percent of Standard Proctor Density with the exception of the upper 300 mm which shall be compacted to a minimum of 100 percent of Standard Proctor Density.

1.7 Building Site Access

The Developer shall, at his own cost and expense, be responsible for building an all-weather access to the proposed building site on each lot. The construction of access road to the building site shall be considered as part of the roadway construction, and culvert shall be provided as required.

1.8 Road Graveling

Upon the Engineer's approval of the roadway construction, the Developer shall supply and place the first lift of gravel in accordance with the specified gradation and rate of application. No graveling shall be permitted on the finished subgrade until the subgrade has been tested, inspected and approved.

The stockpile source of gravel shall be approved by the Municipality. The size and gradation shall conform to the recommended standards.

(a) Rate of Application

The rate of gravel application shall be as outlined below:

1. Initial first lift (upon acceptance of roads) Rate to be 300 cubic metres per kilometre.
2. Second lift (see Section 'C'). Rate to be 250 cubic metres per kilometre.

3. All entrances to lots shall be gravelled at a rate of 8 cubic metres per entrance, as measured from the shoulder of the road to the lot property line.

(b) Gradation

Base Course Gravel (First Lift)

<u>Metric Sieve Size</u>	<u>Percent Passing</u>
25000	100
20000	60 - 96
5000	30 - 65
2000	20 - 45
63	2 - 10

Surface Course Gravel (Second Lift)

<u>Metric Sieve Size</u>	<u>Percent Passing</u>
20000	100
12500	60 - 92
5000	40 - 60
2000	25 - 45
400	10 - 25
63	2 - 10

(c) The placement of the second lift of gravel shall be undertaken at the first anniversary of the Maintenance and Warranty Period, in good weather conditions.

(d) A minimum of fifty percent (50%) by weight of the material retained on the #5000 Sieve shall have at least one fractured face.

RESIDENTIAL SUBDIVISION - RURAL STANDARD

2. Drainage Works

2.1 General

It will be the Developer's responsibility to maintain a trouble-free drainage pattern, whether it is utilizing the natural drainages or additional drainage constructions, such as open ditches, ditch blocks, ditch checks, rip-rapping, etc.

The Developer shall provide right-of-way easements for drainages and have them registered in the name of the Municipality so that future maintenance may be provided.

The Developer shall be responsible not only for the drainages within his development, but also for drainages in the adjoining properties which would be affected by his development.

Drainages works shall include the constructions of ditches, berms and ditch checks; the installations of culverts, rip-raps and other means of erosion control.

Any type of drainage diversion shall be approved and licensed by Alberta Environment.

2.2 Cross-Section Elements

Backslope of channels or ditches shall be 3:1 minimum.

For flat-bottom ditch, the minimum width shall be 3 metres unless otherwise approved by the Engineer.

2.3 Erosion Control

Any drainage channels and road ditches shall be provided with ditch checks or other means of erosion control acceptable to the Municipality.

All drainage channels shall be seeded. In channels, ditches and slopes which are highly susceptible to erosion, sodding shall be provided.

All drainage culverts shall be rip-rapped at both inlet and outlet. The size and type of rip-rap shall conform to good engineering practice and acceptable to the Municipality.

2.4 Culverts

Minimum size of roadway culvert shall be 600 mm (wall thickness 1.6 mm or as required by the loading criteria).

Minimum size of entrance culvert shall be 500 mm (wall thickness 1.6 mm or as required by the loading criteria).

Culvert shall be installed to provide a minimum depth of cover of 300 mm or one-half the diameter of the pipe whichever is greater as measured from the finished shoulder grade of the roadway to the top of the pipe.

RESIDENTIAL SUBDIVISION - RURAL STANDARD

3. Utilities

The Developer shall be responsible for the installation of power, natural gas and telephone services in the subdivision.

Any other utilities that may be required by the Council shall be provided at the sole expense of the Developer.

The Developer of the proposed subdivision is responsible for all arrangements with the utility companies as to the locating and moving of all existing utilities such as power poles, pipelines, telephone poles, buried cables, etc. The Developer shall bear all expenses resulting from any damage done to utilities during road and drainage construction.

The Developer is responsible for obtaining approval of the layouts of utilities alignment from the utility companies and the Engineer.

PART IV

GENERAL SPECIFICATIONS

1. Grading

Description

Grading shall consist of excavating the roadway, the removal and satisfactory disposal of all materials taken from within the limits of the work necessary for the construction and preparation of the embankment, subgrade, shoulders, slopes, gutters, ditches, waterways, highway intersections, approaches and private entrances, to the required alignment, grade and cross-section shown on the plans or as directed by the Engineer.

It shall include the excavation for culverts, under-drains, foundation pits for bridges, trestles, buildings and other structures.

i) Brushing and Grubbing

Method of clearing and removing of trees and debris, also disposing of same is the responsibility of the Developer, but at no time is it to be buried within the road right-of-way or land being dedicated for park reserve.

ii) Dimensions of Excavations and Embankments

The dimensions of the excavations and embankments shall be generally in accordance with the typical sections accompanying these specifications but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Engineer as conditions and circumstances may determine.

iii) Unsuitable Material

Surface soil, vegetable mould or other material unsuitable for the work in hand must be removed, when and as directed by the Engineer and disposed of according to his direction.

iv) Approval of Material

All materials used in embankments, backfilling or for any other purpose must be approved by the Engineer. All suitable material from excavations shall be used in forming embankments or shall be otherwise disposed of as the Engineer may direct.

v) Reservation of Material

Whenever gravel, stone or other material suitable for special use by the Owner is found, the same shall, if required, be reserved and deposited in suitable places along the right-of-way.

vi) Surplus Material

Surplus material in excavation shall be used to widen embankments within the limits of haul. No material shall be wasted and in no case shall material be deposited above the grade of the adjacent roadbed without the permission of the Engineer.

vii) Removal of Snow

No snow or ice shall be placed in embankments or allowed to be covered up in them and the Developer shall, at his own expense, remove snow and ice from any portion of the work, in any of its stages whenever deemed necessary by the Engineer.

viii) Fences

The Developer shall, at his own expense, if so directed by the Engineer, erect and maintain such temporary fences as may be necessary to prevent livestock or other animals from straying upon the right-of-way or adjoining property. He shall carefully remove and replace to the satisfaction of the Engineer all fences which it may be necessary to move in order to carry out the work and will at all times provide against the escape of livestock or other animals through openings made by him in the property fences.

ix) Slides

Material in slips, slides and subsidences, extending beyond the slope lines shall be removed by the Developer at his own expense unless such occurrences were beyond the control of the Developer and not preventable by the use of due care and diligence.

x) Slopes Neatly Trimmed

Slopes undercut at the base or destroyed in any manner, shall be re-sloped to the slope as staked by the Engineer.

In solid rock excavation the slopes must be carefully scaled down and all rocks and fragments liable to slide or roll down the slopes removed to the satisfaction of the Engineer.

xi) Borrow Pit Excavation

The borrowing of materials for embankment will be allowed only after all roadway excavations have been completed and hauled into the embankment or after all the economic possibilities of obtaining further material by widening roadway cuttings or ditches have been exhausted. Borrow excavation shall consist of the excavation and placing of excavated material, obtained from locations outside the right-of-way. The widening of roadway cuts and ditches will not be considered as borrow. Borrow pits will be entered into only on the approval and permission of the Engineer. They shall be regular in width and, if required, shall be connected with ditches and drained to the nearest water-course. When borrowing outside the limits of the right-of-way, side slopes in borrow pits must be left uniform and flat. Particular care shall be taken to work the pit so as to cause a minimum of damage and inconvenience to the owner. On the completion of the work, borrow pits will be left in a neat and uniform condition.

xii) Ditches

Ditches of whatever nature, including stream diversions, which may be considered necessary for the proper drainage of the work, shall be constructed at such points and to such cross-section, alignment and grade as the Engineer may direct.

Catch water ditches, as required, shall be constructed along the tops of the excavations to prevent water flowing into the cuts. The ditches shall be constructed in accordance with the typical plans, where shown on the profile and where designated by the Engineer. If required by the Engineer catch water ditches shall be excavated before the cuts are opened.

xiii) Embankment

(1) Description

Embankment shall be constructed by depositing, shaping and compacting acceptable excavated material. The embankment shall be constructed above the natural ground or other level as directed, in conformity with the lines, grades,

and cross-sections shown on the plans, or staked on the ground by the Engineer.

(2) Construction Methods

(a) Preparation of Existing Ground Surface

(i) Where the proposed subgrade elevation is less than 600mm above the existing ground any undesirable soil shall be removed and wasted, and existing ground ploughed to a depth of 300mm below the original surface and compacted. Where the depth of remaining ground following the removal of undesirable material exceeds 150mm the compaction shall be carried out in two (2) layers; the top layer being windrowed to the side, the bottom ploughed to the required depth and compacted, and the top layer replaced and compacted.

(ii) When the embankments are to be made on a hillside of such nature, that will, in the opinion of the Engineer, preclude a proper bond between the old and new materials, the slope of the original ground on which the embankments is to be placed shall be ploughed deeply or stepped before the filling is commenced. Otherwise, before any embankment is placed in a smooth firm surface, the original ground shall be scarified or ploughed so as to permit bounding the new with the existing material.

(iii) Before any embankment is placed on an existing roadbed, the old roadbed shall be ploughed and bladed out to the full width of the fill section, at the toes of the slopes, to ensure proper bond and a uniform base for the new material placed in the embankment. If so ordered, unsuitable material present in the old roadbed shall be excavated and disposed of as directed by the Engineer.

(iv) Where existing highways are being widened and existing fills extended, extreme care shall be exercised in denuding the existing slopes of all vegetation and either stepping or ploughing them so as to form a medium of contact with the new fill. Vertical cuts for the full depths of embankment to achieve bond will not be permitted.

(b) Placing Material

(i) Embankment shall be formed of suitable material only, stumps, trees, rubbish, sods, top soil or other unsuitable material shall not be placed in the embankment.

(ii) Where rock is being used in the embankment it shall be carefully distributed and the interstices filled with earth or finer particles to form a dense compact mass. No rocks larger than 75mm shall be placed in the embankment closer than 150mm to the surface of the finished roadway.

(iii) Embankment will be constructed so that, after settlement is complete, all embankments shall have the required grade and cross-section at all points. If at any time before final acceptance of the work the embankment settled below the staked grade, it shall be brought back to the staked grade by the Developer.

(c) Compaction

(i) All material placed in embankments shall be bladed smooth in successive layers not to exceed 150mm in depth, to the full width of the cross-section. Each layer shall be compacted by means approved by the Engineer to a minimum of 95 percent of Standard Proctor Density, with the exception of the upper 300mm which shall be compacted in 150mm layers, to a minimum of 100 percent of Standard Proctor Density.

(ii) Where the grade line is in cut, the subgrade shall be excavated to a minimum depth of 300mm, or as directed by the Engineer. The subgrade shall then be reconstructed in layers as specified and compacted to a minimum of 100 percent of Standard Proctor Density.

(iii) In general, compaction over the entire surface area of each layer shall be obtained by the use of tamping rollers, or such other equipment satisfactory to the Engineer. The tamping roller shall be of a type approved by the Engineer and shall consist of a metal drum with tamping feet projecting not less than 175mm from the surface. The weight of the roller shall be such that when fully loaded it shall exert a unit pressure of not less than 2.5 KPa on the tamping face area. The unit pressure shall be determined by dividing the

total weight of the roller by the total surface area of the tamping feet in one row parallel to the axis of the roller.

In the event that satisfactory compaction is not obtained with the use of tamping rollers as specified, the Developer shall provide and maintain in effective operation equivalent or alternative compacting equipment capable of producing the required density.

Hauling equipment will not be accepted in lieu of compaction equipment.

The Engineer reserves the right to order discontinued the use of any equipment or method which in the opinion of the Engineer fails to produce the required density uniformly throughout the work.

(iv) Where in the opinion of the Engineer, the material for embankment is too wet to compact under rolling, the material shall be thoroughly worked until its optimum moisture content is reached, as determined by the Standard Proctor Compaction Test.

(v) The material in each and every layer shall be thoroughly compacted at optimum moisture content to the densities specified herein, by the use of compaction equipment satisfactory to the Engineer. Test for moisture and density determinations shall be carried out for each 1,250 sq.metres.

(d) Water for Compaction

Where in the opinion of the Engineer the material for embankment is too dry to compact under rolling, water shall be added. The material shall be thoroughly disced and broken down, water added in amounts as directed by the Engineer and the material thoroughly worked to mix the water uniformly throughout the soil, prior to commencing compaction operations. The water sprinklers used shall be of a type satisfactory to the Engineer.

xiv) Culverts - General

Pipe culverts will be supplied by the Developer. They shall be installed as far in advance of the grading as possible.

(1) Construction Methods

Culverts shall be placed so that the minimum distance from the finished grade of the roadway to the top of the pipe shall be not less than one-half the diameter of the pipe with a minimum of 300mm.

A trench shall be excavated to the depth and grade established by the Engineer. The bottom of the trench shall be shaped to conform to the bottom of the pipe and to afford a firm and uniform bearing throughout the entire length of the culvert. If, in the opinion of the Engineer, the material in the bottom of the excavation is of such a character as to cause unequal settlement along the length of the culvert, the trench shall be dug below the grade given, to such a depth as ordered, and backfilled with approved granular material and thoroughly tamped or otherwise compacted to insure an unyielding foundation.

Where the trench is in solid rock or other hard material, it shall be excavated to a depth of at least 100mm below the grade established for the bottom of the pipe, and this additional excavation shall be backfilled with suitable material in such manner as to insure a uniform bearing for the length of the culvert.

Selected backfilling material, free from stones, frozen lumps, etc., shall be placed under and around the pipe and thoroughly tamped or otherwise compacted in place. The trench shall be completely filled and the pipe covered to a depth of at least 300mm with hand placed and properly compacted material before the construction of embankment over the culvert shall proceed in the usual manner.

If a trench is not required, the culvert pipe shall be laid true to line and grade, on a bed that is uniformly firm throughout its entire length, and the backfilling around and over the pipe shall be completed as specified in the preceding paragraph.

When corrugated iron pipe is used, the pipe shall be laid in the trench with the separate sections firmly joined together and with outside laps of circumferential joints pointing upstream and with longitudinal laps on the side. Corrugated iron pipe shall be so handled as to prevent bruising and scaling. In no case shall pipe culverts be dragged on the ground.

(2) Removing Existing Culverts and Structures

Where it is necessary to remove any existing culvert or structures from the grade or right-of-way, the Developer shall carefully remove and pile or place the materials as directed by the Engineer.

xv) Rip-Rap General

When required by the plans or as ordered by the Engineer, embankments, the ends of culverts and ditch bottoms may be protected by hand laid or random rip-rap as directed.

(1) Hand Laid Rip-Rap

Hand laid rip-rap shall be placed on the slope extending upwards from the footing. The stones selected shall be sound and durable and shall in no case measure less than 0.014 cubic metres.

(a) Construction Methods

The stones shall be placed with their beds at right angles to the slope, the larger stones being used in the bottom courses, and the smaller stones at the top. They shall be laid in close contact so as to break joints, and in such manner that the weight of the stone is carried by the earth and not by the adjacent stones. The spaces between the larger stones shall be filled with spalls securely rammed into place. The finished work shall present an even, right, and reasonably plain surface, varying not more than 75mm from the required contour.

(2) Random Rip-Rap

Random rip-rap, graded so that the smaller stone is uniformly distributed throughout the mass, shall be dumped promiscuously over the area until the required depth is attained. The occasional manual

handling or refractory rocks or stones shall in no manner be construed to transform the classification of random rip-rap into that of hand laid rip-rap.

(3) Sacked Concrete or Sacked Soil Cement Rip-Rap

(a) Soil Cement

Soil-cement material for Sacked Soil-Cement Rip-Rap shall be manufactured in accordance with the requirements of the Engineer.

Sand or gravel material and Portland cement for the manufacture of soil-cement for Sacked Soil-Cement Rip-Rap shall be supplied by the Developer.

(b) Burlap Sacks

Burlap Sacks for Sacked Concrete Rip-Rap will be of approximately 0.029 cubic metres.

(c) Preparation of Base for Sacked Concrete or Sacked Soil-Cement Rip-Rap

The base shall be formed by excavating, filling and shaping to the required depth below and parallel to the finished surface of the rip-rap. The entire base shall be thoroughly compacted to provide a smooth and firm foundation of uniform density.

(d) Placing Sacked Concrete or Sacked Soil-Cement Rip-Rap

Each burlap sack shall be filled to two-thirds (2/3) of its capacity with concrete or soil-cement, securely sewn or stapled to form a straight edge closure and immediately placed in its final position on the prepared base. The filled sack shall be kneaded, rammed and packed into conformance with the prepared base and adjacent sacks already in position to form a closely moulded smooth surface of uniform average depth of not less than 125mm.

All joints between rows shall be staggered to pattern and all dirt and debris shall be removed from tops of sacks before succeeding courses are placed.

Not more than five (5) courses of sacks shall be placed in any tier before such time as initial set has taken place in the first course of any such tier.

Following placing, the sacked concrete or sacked soil-cement shall be kept moist for a period of twenty-four (24) hours by sprinkling, moist earth covering or other satisfactory means.

xvi) Rock Ditch Checks

If so ordered rock ditch checks will be constructed in accordance with the plans or as directed by the Engineer.

xvii) Treated Timber Ditch Checks

Ditch check materials will be supplied by the Developer. Ditch checks will be built in accordance with the plans or as directed by the Engineer.

xviii) Finishing and Maintaining

The Developer shall, as soon as practicable, bring the excavations and embankments to the correct widths, lines and grades as shown by the Engineer and no more than 1.6 km of grade shall be in the rough at any one time. As fast as the excavations and embankments are completed to the correct widths, lines and grades, the Developer shall maintain the roadway with a blade machine.

Maintenance will continue daily or at frequent intervals depending on the effects of traffic and the elements upon the accepted portion of the roadway. Ditches and culverts shall be kept free from obstruction so that water will flow freely at all times. This maintenance shall be continued by the Developer until the roadway is completed.

xix) Final Acceptance

Condition requisite for the final acceptance of the work shall be a roadway, smooth and compact over the entire width. Firm side slopes with regular shoulder lines, clean side ditches, satisfactory approaches, intersections and entrances and smooth back slopes. All soft yielding materials in the roadway that does not compact shall be removed and replaced with acceptable materials and all loose stones, clods, weeds, trash, etc., shall be removed from the roadway, sideslopes, ditches, and backslopes. All improperly compacted material shall be excavated, dried to optimum moisture content if required, and recompactd by the Developer. All boulders found in excavation shall be broken off or removed to a depth of at least 300mm below finished section and the depression caused thereby filled with

acceptable material. On the side slopes and back slopes and in the bottom of ditches all projecting boulders must be removed or broken off at least flush with the lines and grades, and the resultant cavities, if any, backfilled.

xx) Preservation of Survey Monuments

The Developer shall be responsible for the proper preservation of all survey monuments and property marks along and adjacent to the roadway. He shall use suitable precautions to protect from damage or disturbance such survey monuments and property marks until their location has been witnessed or otherwise referenced and he shall not remove them until directed by the Engineer.

xxi) General

(a) It shall be noted that these specifications do not classify materials. For this reason the best material available on site shall be used in the construction.

(b) It shall be noted that the method of measurement of quantities and method of payments are not included in these specifications, arrangements shall be between the Developer or Owner and the Contractor or Contractors.

(c) The construction costs of any one project or development shall strictly be between the Developer and his Contractor.

(d) These specifications shall control method and procedure of construction only.

(e) In the instance of parks, the Developer may not, without a written consent of the County or Municipal District, attempt to borrow dirt from a park reserve. He may not use this area to rid himself of undesirable material during road construction. If work is to be done in a park reserve, such as drainage or filling of low area it will be specified in the road design specifications for the particular subdivision.

2. Drainage

It will be the Developer's responsibility to provide a trouble-free drainage pattern, whether it is utilizing the natural drainages or additional drainage constructions to achieve this pattern, such as open ditches, ditch blocks, ditch checks, etc.

The Developer shall be responsible not only for the drainages within his development but also for drainage within adjoining properties which may be affected by his development. It may be required that the developer improve drainage channels and provide easements in adjoining properties.

The Developer will provide right-of-way for such drainages, and have them registered in the County's name so that future maintenance may be provided on these drainages. "See Specimen of Easement".

3. Gravelling

Each subdivision will have a specified rate of gravelling required for each individual road as soil conditions may vary resulting in gravelling rate adjustment. See specifications for gravel, under PART III.

It shall be the Developer's responsibility to supply, haul and place the gravel on the constructed road to the specification of the Engineer. The gravelling shall be done at the sole expense of the Developer. If Council requires that the road be light hard surfaced the Developer shall provide same as outlined under the heading of "Surfacing".

4. Signs

The Developer shall provide all necessary traffic signs as specified by the Engineer.

These signs shall conform to the Standards as set out in the second edition of Uniform Traffic Control Devices for Canada according to the Roads and Transport Association of Canada. All the necessary signs shall be supplied and erected at the sole expense of the Developer.

5. Landscaping and Seeding

- 1) The Developer shall be responsible for all landscaping and seeding of backslopes, sideslopes and ditches within the road right of way, and also slopes of the ditches used for drainages; the Developer shall landscape with topsoil which was removed and placed into stockpiles or as it becomes available within the road, he shall place

the topsoil to a uniform depth and remove all roots, stumps and rocks.

The landscaping materials shall be blended with the excavated slopes by using a grader and/or harrows or any other method the Developer may employ to achieve the required results. The slopes must be so prepared that the seeding of the slopes may commence shortly afterwards.

- ii) All such seeding shall conform to the specifications of the District Agriculturist.
- iii) It shall be the Developer's responsibility to establish a good sound growth of grass on the slopes and in the ditches of the road right of way, the same will apply to drainage ditch slopes that have been constructed to serve the subdivision.
- iv) All such seeding and landscaping shall be at the sole expense of the Developer.

6. Light Hard Surfacing

General

The Developer shall be responsible for the supply of all necessary materials, labour and equipment, and to construct and place a light hard surface on the travelled portion of the road to a specified width and thickness.

This light hard surface shall be constructed at the sole expense of the Developer.

An agreement may be reached with Council and Land Developer to have this work performed by the County forces and the Developer is to reimburse the County all costs incurred in performing this work.

Due to local variations a detailed specification should be established to the satisfaction of the Engineer for each project.

The materials used in the construction of a light hard surface shall approximately fall within the ranges outlined below.

(a) Mineral Aggregates (suggested Gradation)

<u>SIEVE SIZE</u>	<u>PER CENT PASSING BY WEIGHT</u>
20000	100
12500	60 - 92
5000	40 - 60
2000	25 - 45
400	10 - 25
63	2 - 10

(b) Asphaltic Materials

<u>Material</u>	<u>Suggested Grade</u>	<u>Suggested Rate of Application</u>
Prime Coat	MCO or MC30	0.54L-1.9L per sq.m.
Asphaltic Binder	MC2 or MC250	3.5-5% by weight of mix
Fog Coat	MCO or MC30	0.27L-0.54L per sq.m.

Construction

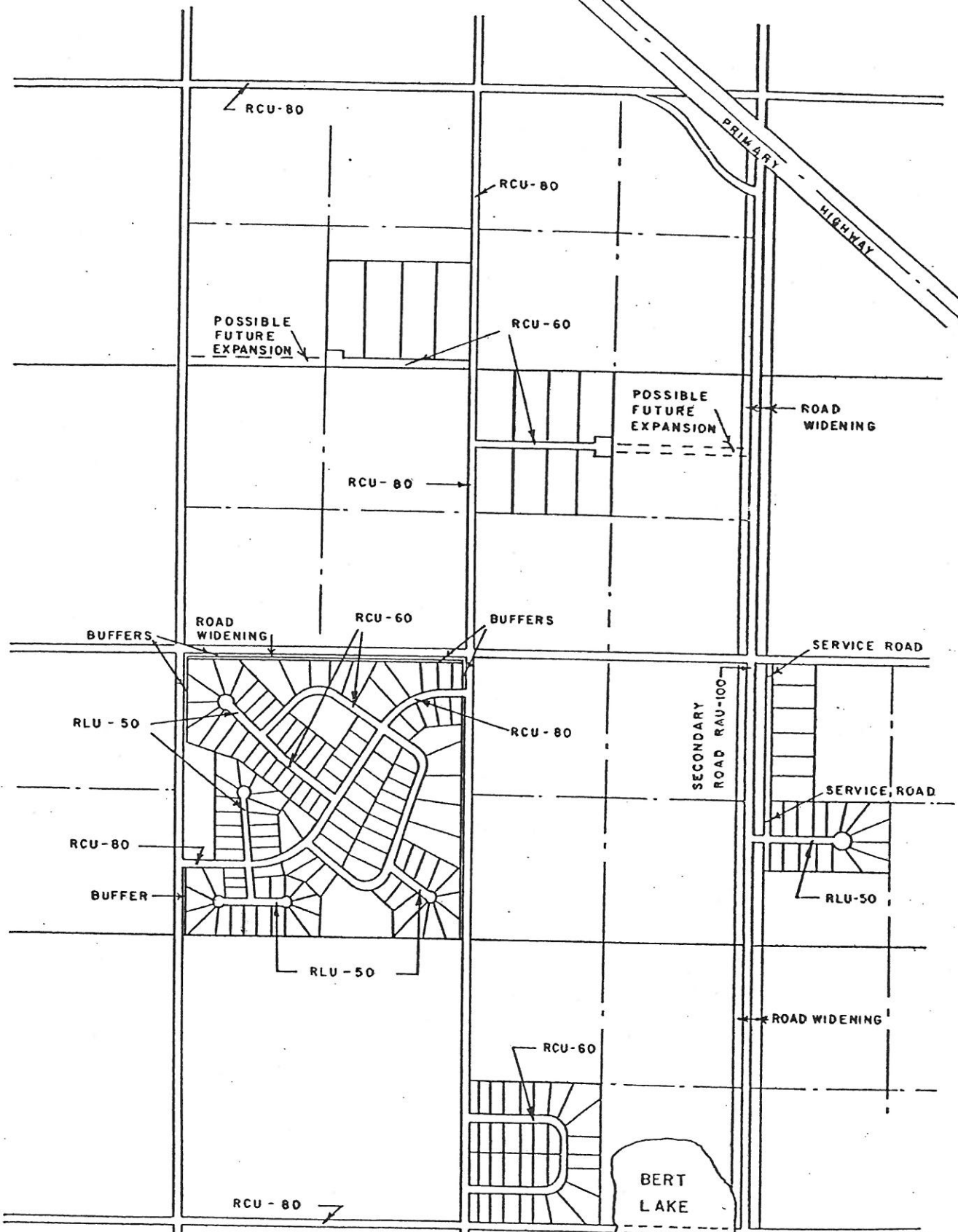
The construction procedure will generally follow along these lines. Prior to construction of a light hard surface the subgrade shall be approved by the Engineer.

Upon the approved subgrade a prime coat shall be uniformly applied at the rate required.

The mineral aggregates shall then be placed in windrows, then the application of asphaltic binder and mixing operations is to take place, and continued until the desired uniform mixture is reached.

This mixture shall then be moved and spread over the full roadway width to a smooth and even contour, after the mixture is spread it shall be thoroughly compacted to the desired density.

A fog coat if required shall then be applied to the finished light hard surface.



RESIDENTIAL SUBDIVISION
 RURAL STANDARD
 ROAD CLASSIFICATION

CLASSIFICATION	Code Number	Design Speed - Km/h	Posted Speed - Km/h	Minimum Vertical Curve			Criteria Minimum P.S.D. (Meters)	Minimum Right-of-way (Meters)
				Crest Minimum S.S.D. (Meters)	Sag Minimum S.S.D. (Meters)	Minimum (Meters)		
RURAL	Local Undivided	50	30	65	65	340	30	
	Collector Undivided	RCU-60	60	50	85	85	420	30
		RCU-80	80	60	140	140	560	30
		RCU-100	100	60	200	200	680	30
		RAU-80	80	60	140	140	560	30
	Arterial Undivided	RAU-100	100	80	200	200	680	40
		RAU-110	110	100	220	220	740	45
	Arterial Divided	RAD-100	100	80	200	200	680	As required
		RAD-110	110	100	220	220	740	As required

CLASSIFICATION	Code Number	Design Speed - Km/h	Posted Speed - Km/h	MAXIMUM RATE OF CURVATURE (DEGREES)		MAXIMUM GRADIENT (%)		Maximum Superelevation e max	
				Flat	Other (Use only in extreme cases)	Flat	Other (Use only in extreme cases)		
RURAL	Local Undivided	50	30	7.5	25	6.5	8.0	0.08	
	Collector Undivided	RCU-60	60	50	5.5	12	6.0	7.5	0.08
		RCU-80	80	60	5.0	12	5.5	7.0	0.08
		RCU-100	100	60	5.0	12	4.0	7.0	0.08
		RAU-80	80	60	5.0	12	3.5	7.0	0.08
	Arterial Undivided	RAU-100	100	80	3.5	7.5	3.5	7.0	0.08
		RAU-110	110	100	3.5	7.5	3.0	6.0	0.08
	Arterial Divided	RAD-100	100	80	5.0	7.5	3.0	6.0	0.08
		RAD-110	110	100	3.5	7.5	2.5	5.0	0.08

Note: In areas where there may be long periods of severe roadway icing, a maximum rate of superelevation of 0.06 m/m should be used.



MINIMUM DESIGN CRITERIA RURAL DEVELOPMENT

ALGEBRAIC DIFFERENCE IN GRADIENT%	LENGTH (METRES)											
	50 Km/h 65 S.S.D.		60 Km/h 85 S.S.D.		80 Km/h 140 S.S.D.		100 Km/h 200 S.S.D.		110 Km/h 220 S.S.D.			
	CREST	SAG	CREST	SAG	CREST	SAG	CREST	SAG	CREST	SAG		
1	65	65	65	65	75	75	90	90	100	100		
2	65	65	65	65	75	75	140	100	170	110		
3	65	65	65	65	100	90	210	150	255	165		
4	65	65	75	75	140	120		200		220		
5	65	65	85	100		150		250		275		
6	65	70										
7	65	80										
8	90	90										

MINIMUM LENGTH OF VERTICAL CURVE RURAL STANDARD



METRIC
STEWART, WEIR & Co.

SUPERELEVATION, e max. = 0.08

Design speed km/Hr.	50		60		70		80		90		100		110	
	e		e		e		e		e		e		e	
5000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	RC	RC	0.020
3000	NC	NC	NC	NC	NC	NC	NC	NC	NC	RC	RC	0.022	0.026	0.026
2000	NC	NC	NC	NC	RC	RC	0.021	0.021	0.026	0.032	0.032	0.030	0.035	0.035
1500	NC	NC	RC	RC	RC	0.026	0.027	0.032	0.032	0.038	0.044	0.037	0.043	0.043
1200	NC	RC	RC	RC	0.029	0.032	0.036	0.036	0.043	0.049	0.052	0.049	0.056	0.056
1000	RC	RC	0.023	0.025	0.032	0.039	0.042	0.042	0.046	0.053	0.060	0.060	0.067	0.067
900	RC	0.020	0.027	0.030	0.035	0.042	0.046	0.050	0.058	0.065	0.071	0.071	0.078	0.078
800	0.023	0.026	0.030	0.034	0.038	0.044	0.050	0.056	0.064	0.071	0.078	0.078	0.080	0.080
700	0.026	0.030	0.034	0.039	0.044	0.050	0.056	0.063	0.071	0.078	0.080	0.080	0.080	0.080
600	0.030	0.035	0.039	0.045	0.050	0.056	0.063	0.071	0.078	0.080	0.080	0.080	0.080	0.080
500	0.035	0.040	0.045	0.050	0.056	0.063	0.071	0.078	0.080	0.080	0.080	0.080	0.080	0.080
400	0.038	0.042	0.049	0.053	0.058	0.063	0.069	0.073	0.075	0.075	0.075	0.075	0.075	0.075
350	0.042	0.047	0.053	0.059	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075
300	0.047	0.051	0.057	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075
250	0.051	0.054	0.057	0.060	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075
220	0.054	0.057	0.060	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075
200	0.057	0.060	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
180	0.060	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
160	0.062	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
140	0.065	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
120	0.068	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
100	0.072	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
90	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
80	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
70	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
60	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075

e max. = 0.08

Notes

- e is super elevation
- NC is normal cross section
- RC is remove adverse crown & superelevate at normal rate

SUPERELEVATION, e max. = 0.06

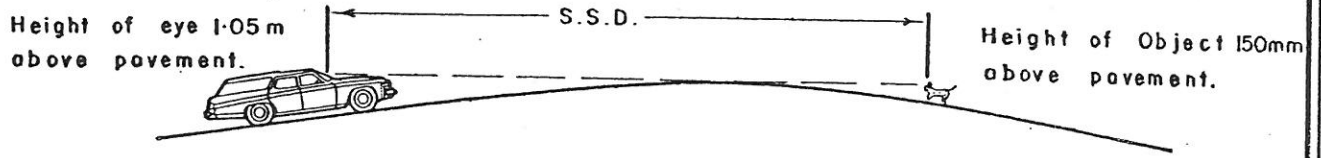
Design speed km/Hr. Radius, m	50	60	70	80	90	100	110
	e	e	e	e	e	e	e
4000	NC	NC	NC	NC	NC	RC	RC
3000	NC	NC	NC	NC	RC	0.025	0.023
2000	NC	NC	RC	RC	0.023	0.027	0.031
1500	NC	RC	RC	0.024	0.029	0.033	0.037
1200	NC	RC	0.023	0.028	0.033	0.038	0.042
1000	RC	0.021	0.027	0.032	0.037	0.042	0.046
900	RC	0.023	0.029	0.034	0.039	0.044	0.049
800	RC	0.025	0.031	0.036	0.042	0.047	0.051
700	0.021	0.027	0.034	0.039	0.045	0.049	0.054
600	0.024	0.030	0.037	0.042	0.048	0.053	0.057
500	0.027	0.034	0.041	0.046	0.052	0.057	0.060
400	0.031	0.038	0.045	0.051	0.057	0.060	MIN. R = 525
350	0.034	0.041	0.048	0.054	0.059	0.060	MIN. R = 420
300	0.037	0.044	0.051	0.057	0.060	0.060	MIN. R = 340
250	0.040	0.048	0.055	0.060	0.060	0.060	MIN. R = 250
220	0.043	0.050	0.057	0.060	0.060	0.060	MIN. R = 190
200	0.045	0.052	0.059	0.060	0.060	0.060	MIN. R = 130
180	0.047	0.054	0.060	0.060	0.060	0.060	0.060
160	0.049	0.056	0.060	0.060	0.060	0.060	0.060
140	0.052	0.059	0.060	0.060	0.060	0.060	0.060
120	0.055	0.060	0.060	0.060	0.060	0.060	0.060
100	0.058	0.060	0.060	0.060	0.060	0.060	0.060
90	0.060	0.060	0.060	0.060	0.060	0.060	0.060
80	0.060	0.060	0.060	0.060	0.060	0.060	0.060
	MIN. R = 90						

e max. = 0.06

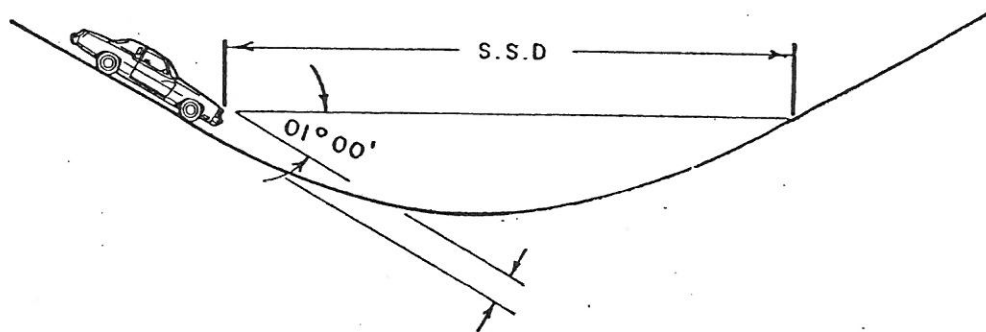
Notes

- e is super elevation
- NC is normal cross section
- RC is remove adverse crown & superelevate at normal rate

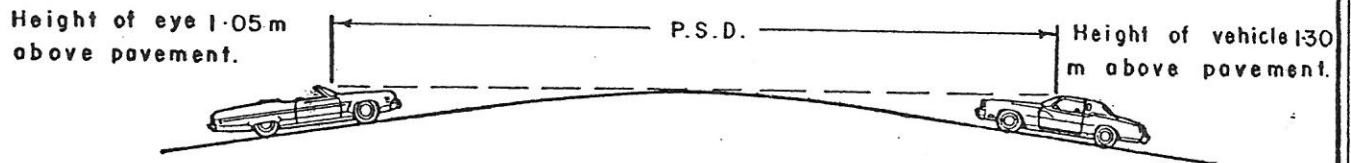
STOPPING SIGHT DISTANCE ON CREST VERTICAL CURVES



STOPPING SIGHT DISTANCE ON SAG CURVES

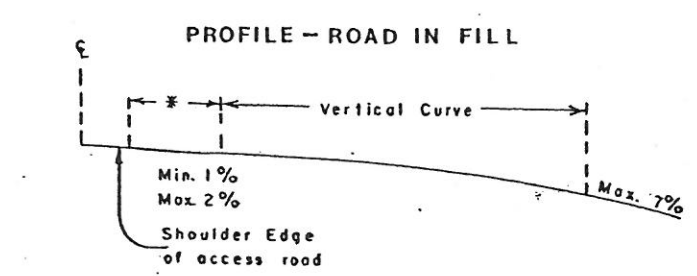
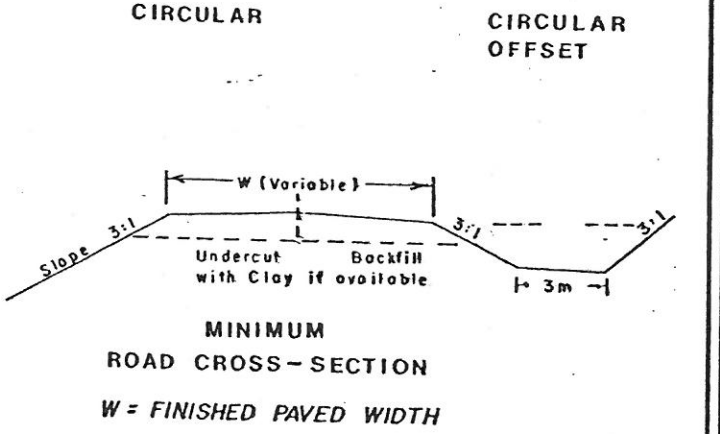
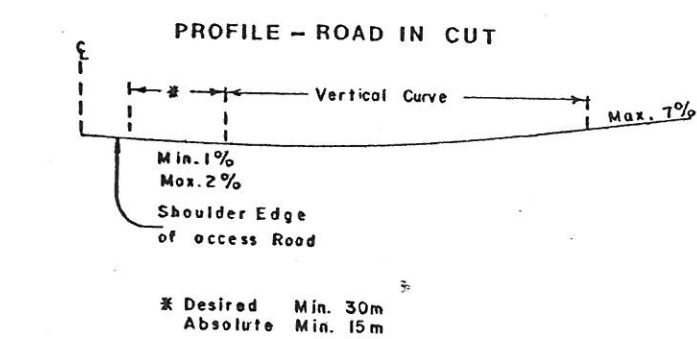
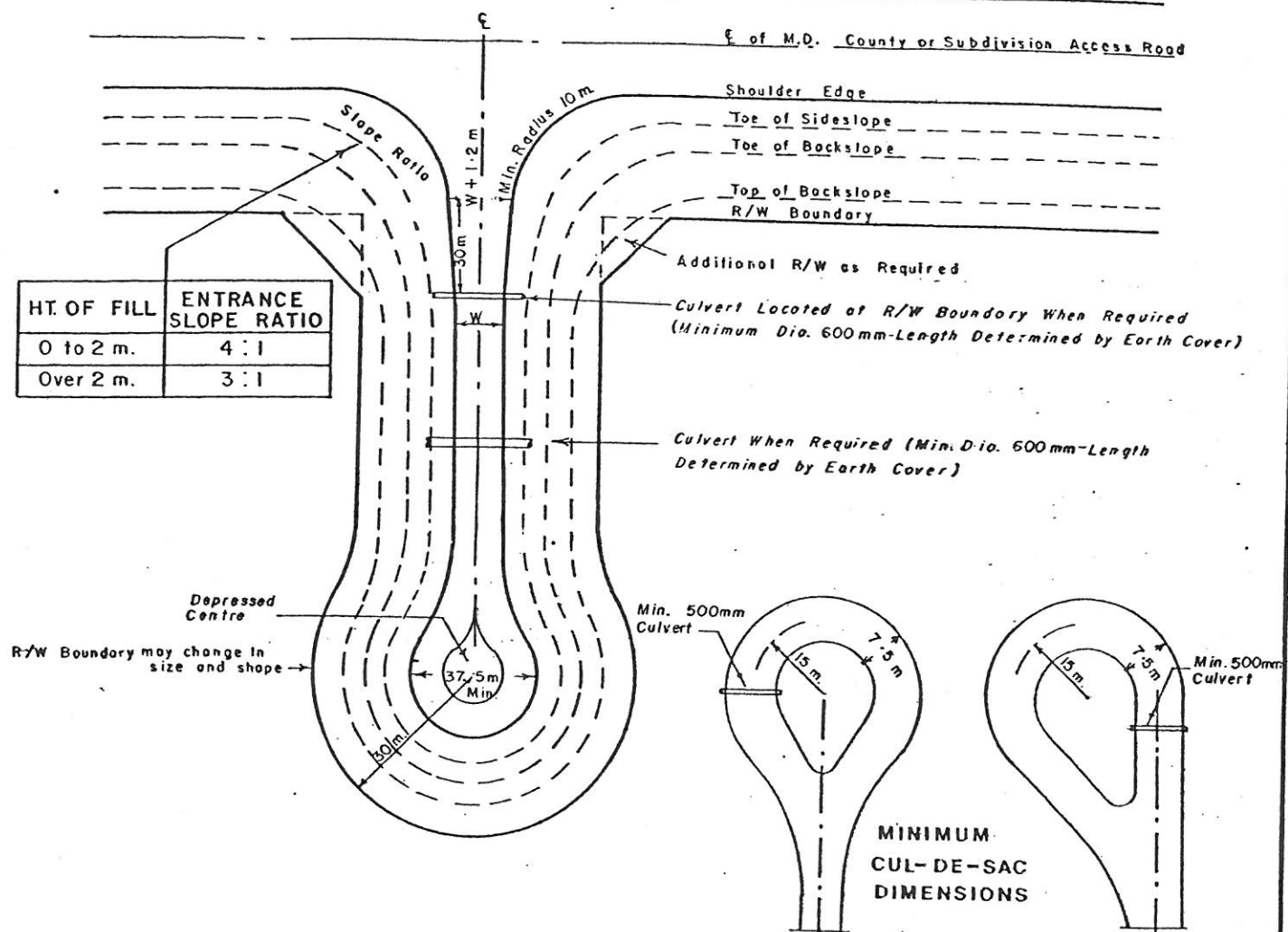


PASSING SIGHT DISTANCE ON CREST VERTICAL CURVES



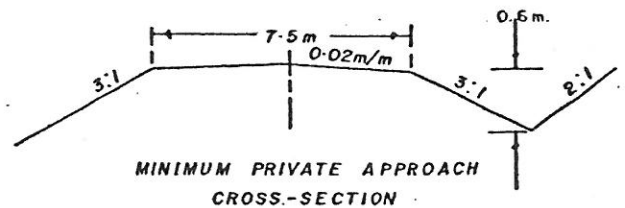
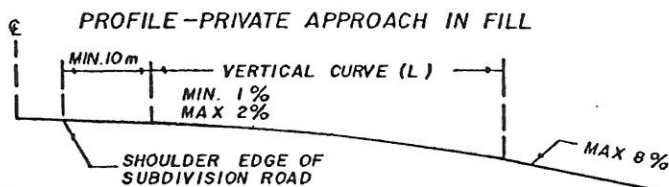
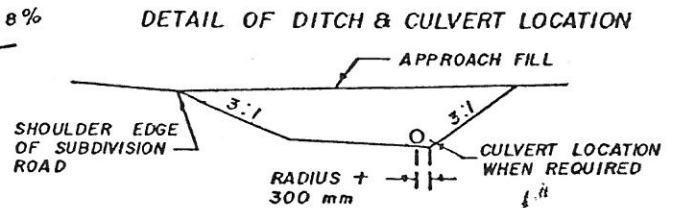
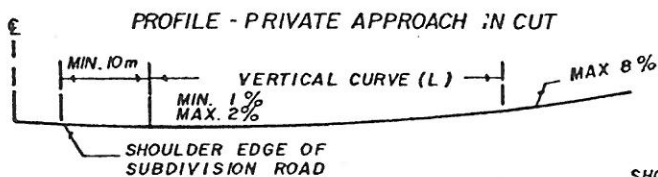
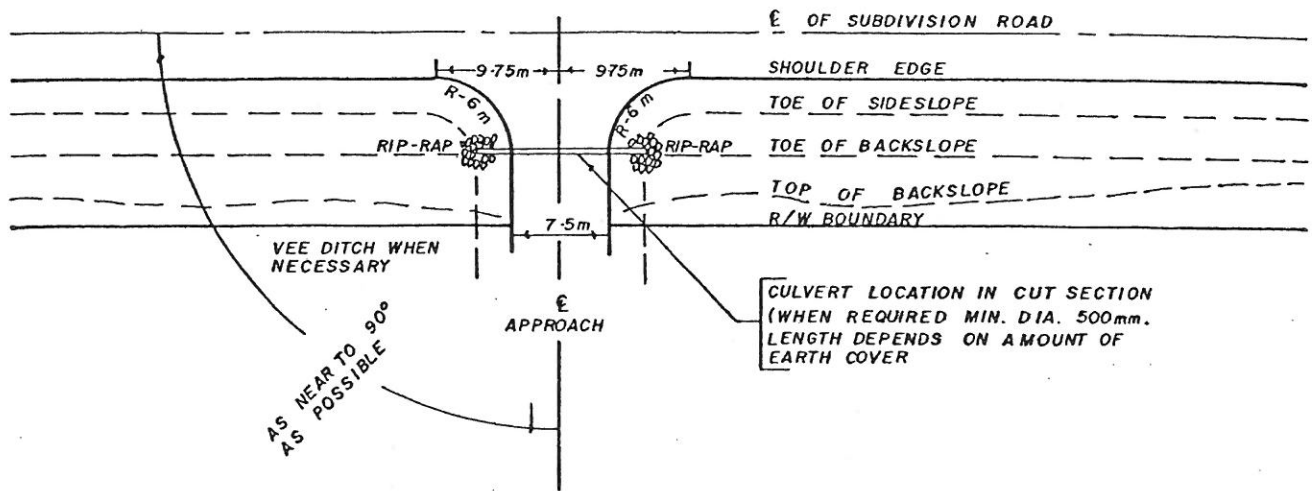
DESIGN SPEED Km/h	MINIMUM PASSING SIGHT DISTANCE METRES	MINIMUM STOPPING SIGHT DISTANCE METRES
50	340	65
60	420	85
80	560	140
100	680	200
110	740	220

SIGHT DISTANCE CRITERIA



DESIGN SPECIFICATIONS

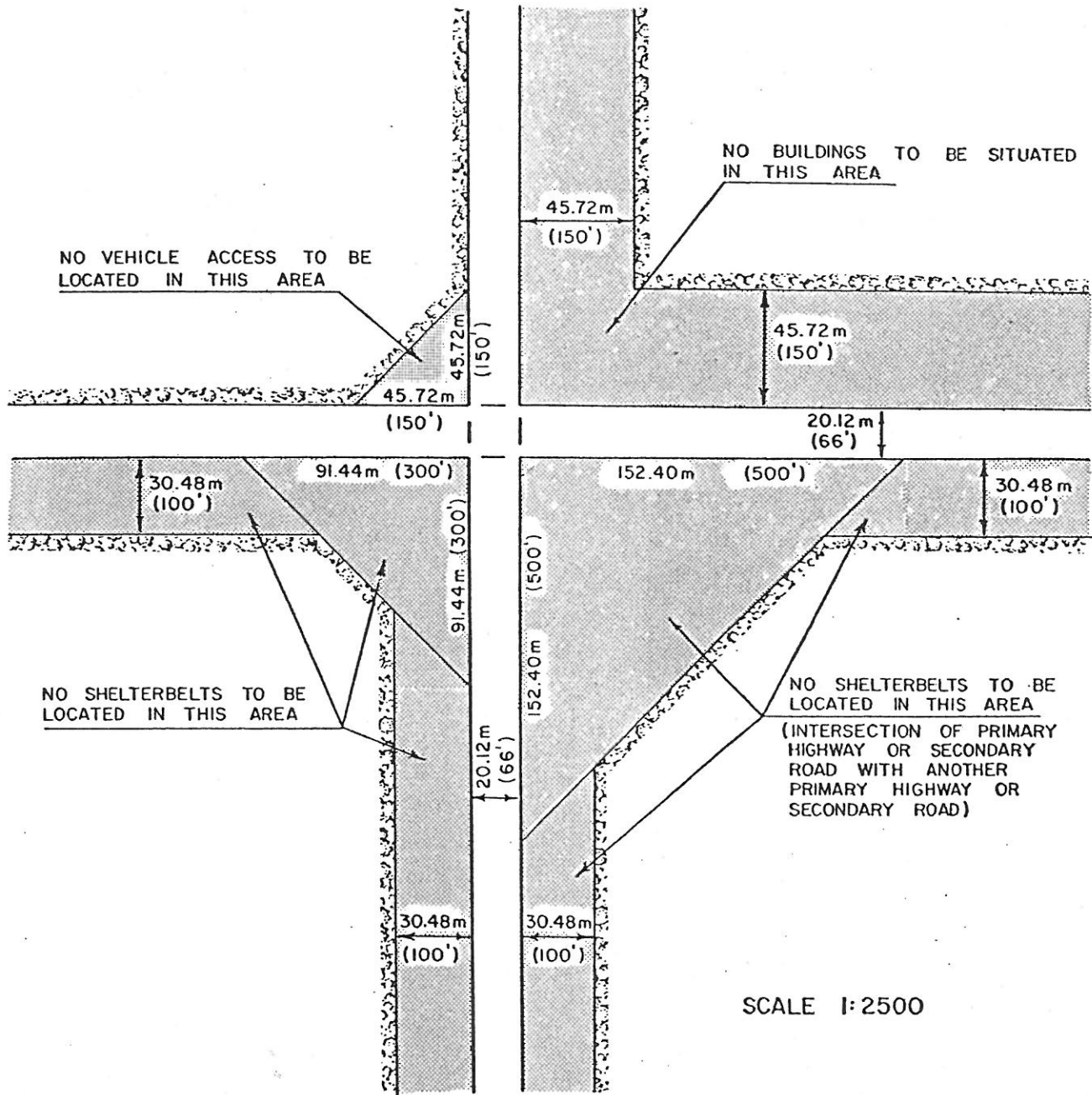
(subdivision, rural standard) roads and their approaches



ALGEBRAIC DIFFERENCE IN GRADIENT (%)	MINIMUM LENGTH OF VERTICAL CURVE	
	LENGTH L (METRES)	
	CREST	SAG
1	6	7.5
2	12	15
3	18	23
4	25	30
5	30	38
6	37	46
7		46
8		46
9		46

NOTE
ALL ENTRANCES ARE TO BE FROM THE INTERNAL ROAD SYSTEM AND ARE TO PROVIDE REASONABLE ACCESS TO THE LOTS, EACH LOT IS TO HAVE A PRIVATE APPROACH.

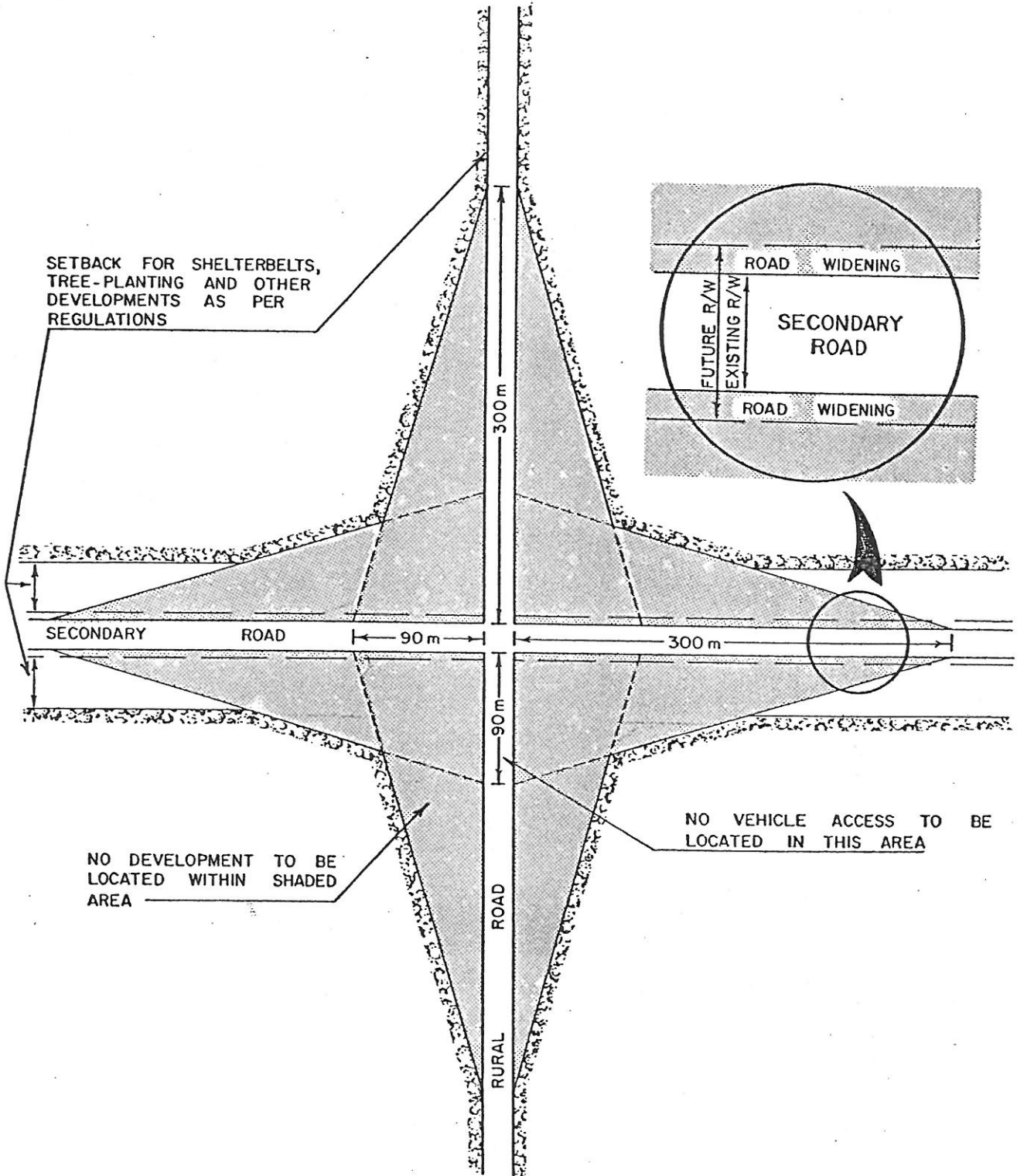
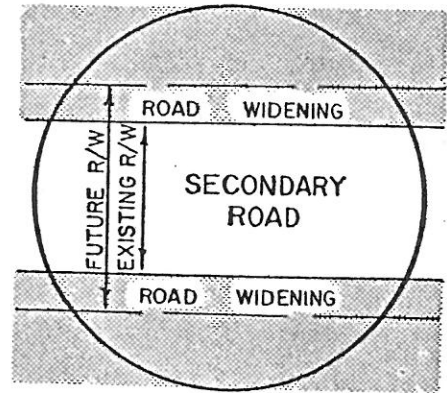
PRIVATE APPROACHES RURAL STANDARD



ACCESS & DEVELOPMENT CONTROL

MUNICIPAL GRID ROAD INTERSECTION

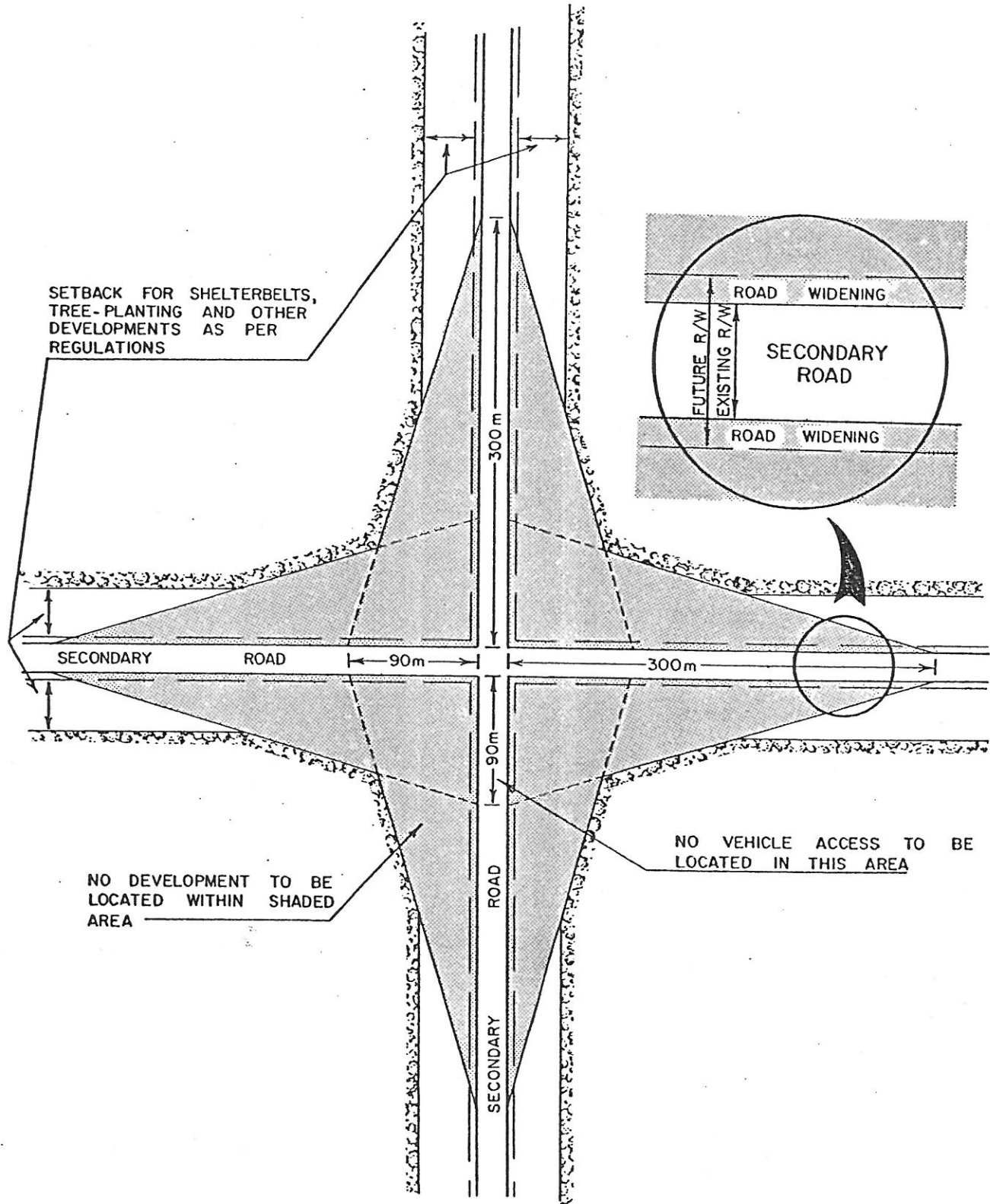
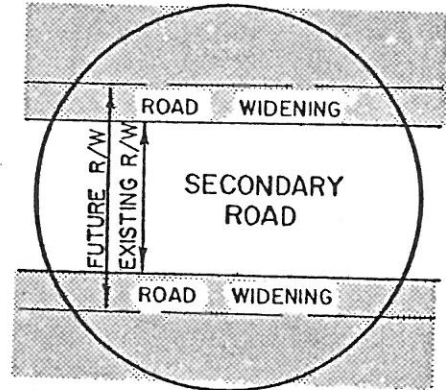
SETBACK FOR SHELTERBELTS,
TREE-PLANTING AND OTHER
DEVELOPMENTS AS PER
REGULATIONS



ACCESS & DEVELOPMENT CONTROL

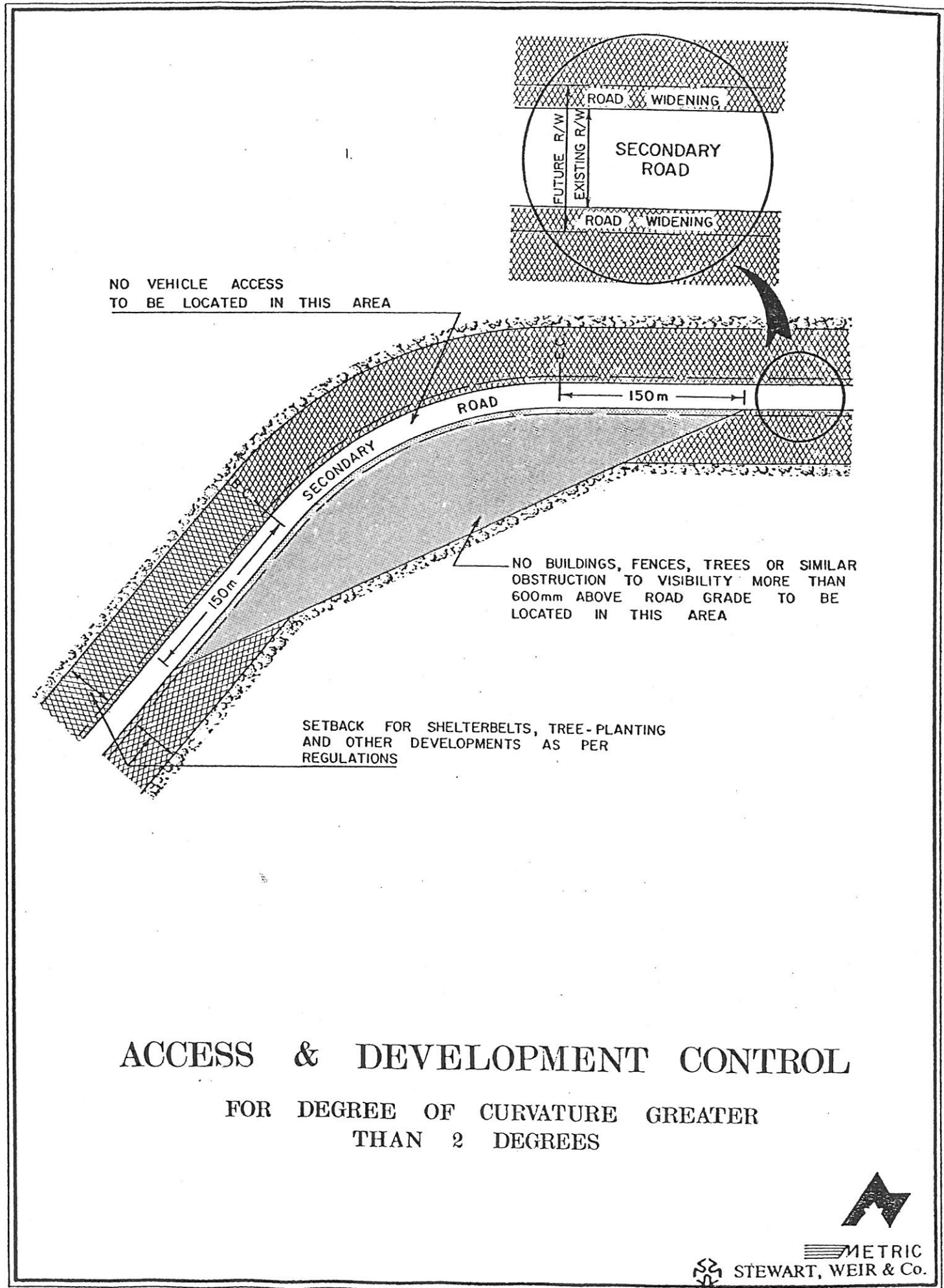
SECONDARY ROAD - RURAL ROAD INTERSECTION

SETBACK FOR SHELTERBELTS,
TREE-PLANTING AND OTHER
DEVELOPMENTS AS PER
REGULATIONS



ACCESS & DEVELOPMENT CONTROL

SECONDARY ROAD — SECONDARY ROAD
INTERSECTION



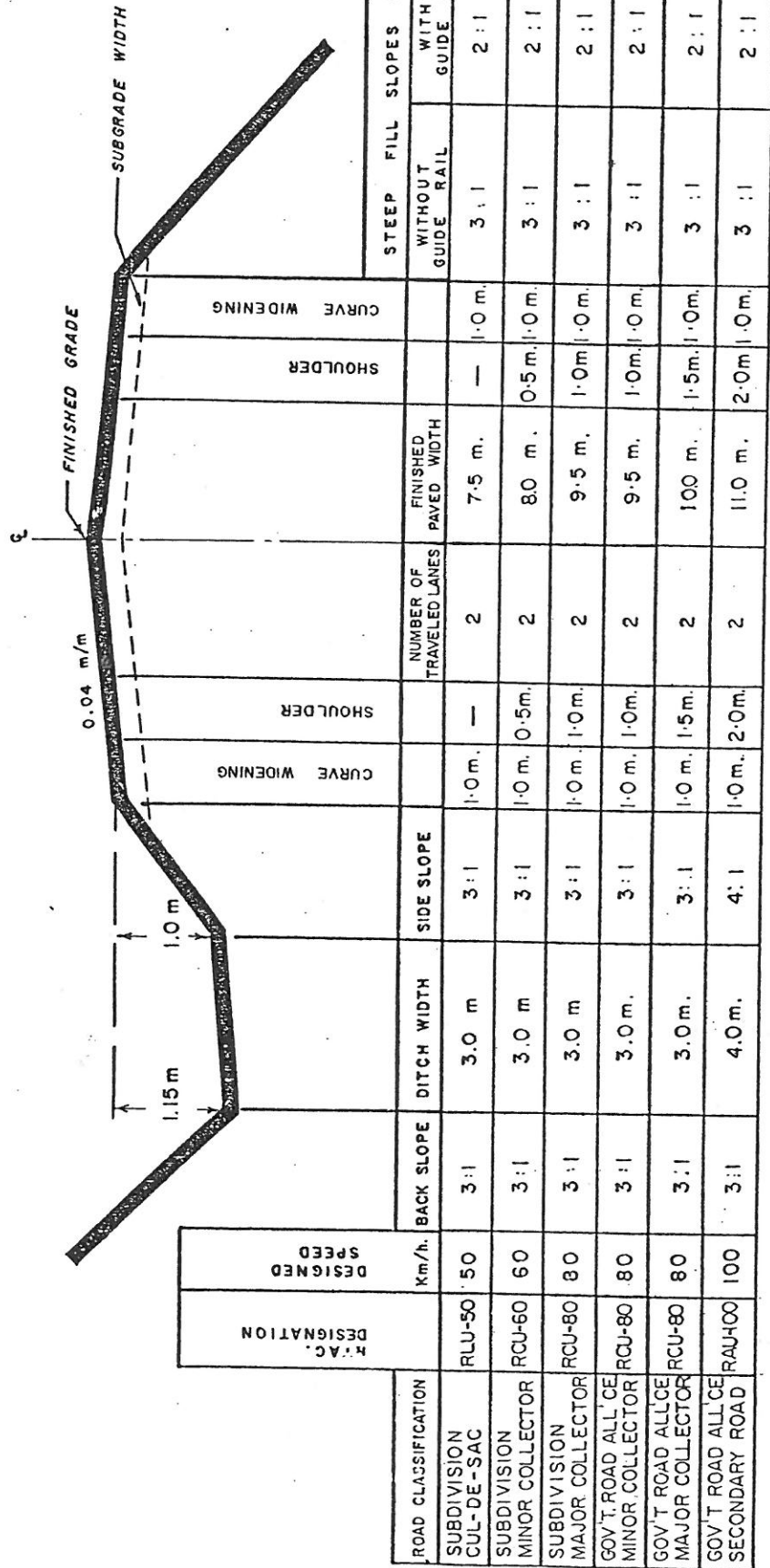
ACCESS & DEVELOPMENT CONTROL

FOR DEGREE OF CURVATURE GREATER
THAN 2 DEGREES



CROSS-SECTION ELEMENTS

RESIDENTIAL SUBDIVISION - RURAL STANDARD

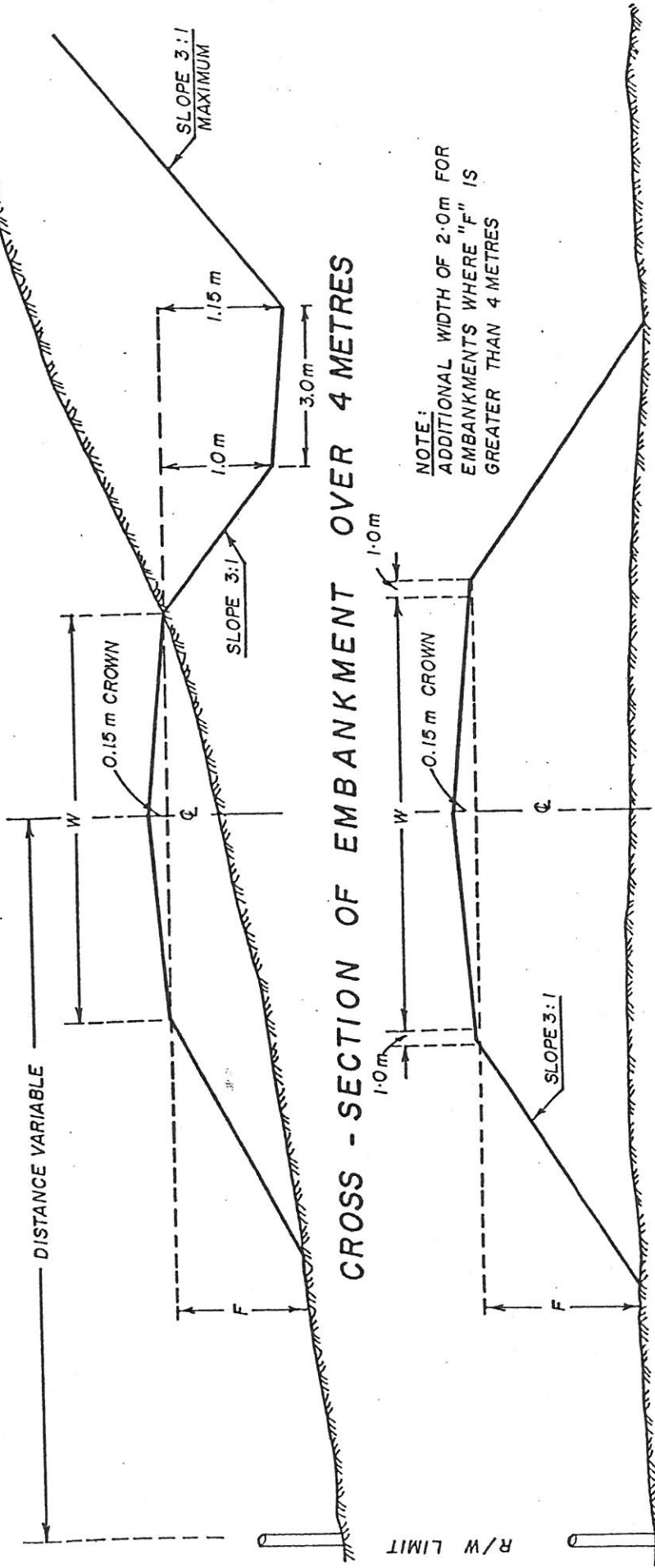


NOTE:

- (1) THE ABOVE ARE MINIMUM REQUIREMENTS, IN SANDY SOILS OR SOILS HIGHLY SUSCEPTIBLE TO WIND OR WATER EROSION SLOPES OF 4:1 RATIO OR BETTER SHALL BE ATTAINED.
- (2) THE THICKNESS OF THE PAVEMENT STRUCTURE SHALL GOVERN THE SUBGRADE WIDTH.



CROSS - SECTION OF SIDEHILL ON TANGENT



CROSS - SECTION OF EMBANKMENT OVER 4 METRES

NOTE:
ADDITIONAL WIDTH OF 2.0m FOR
EMBANKMENTS WHERE "F" IS
GREATER THAN 4 METRES

EARTH CUT SECTION
3:1 SLOPE FOR AVERAGE FILL LESS THAN 3 METRES
W = FINISHED PAVED WIDTH

EARTH CUT SECTION
WIDTH OF DITCH - 3.0 m MINIMUM
DITCH CROSS SLOPE - 0.05m/m

STANDARD CROSS - SECTION FOR SUBDIVISION ROAD

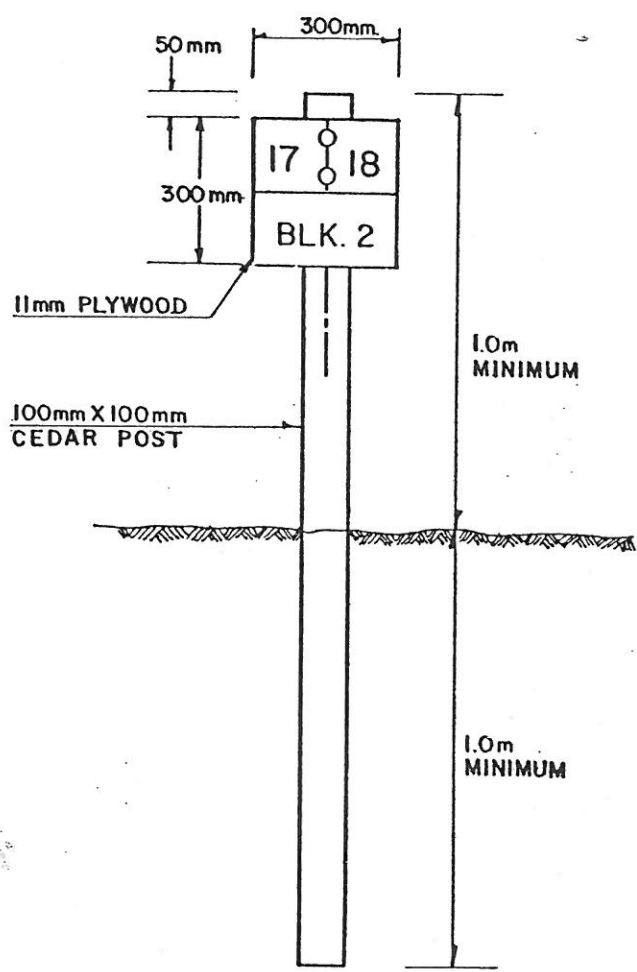
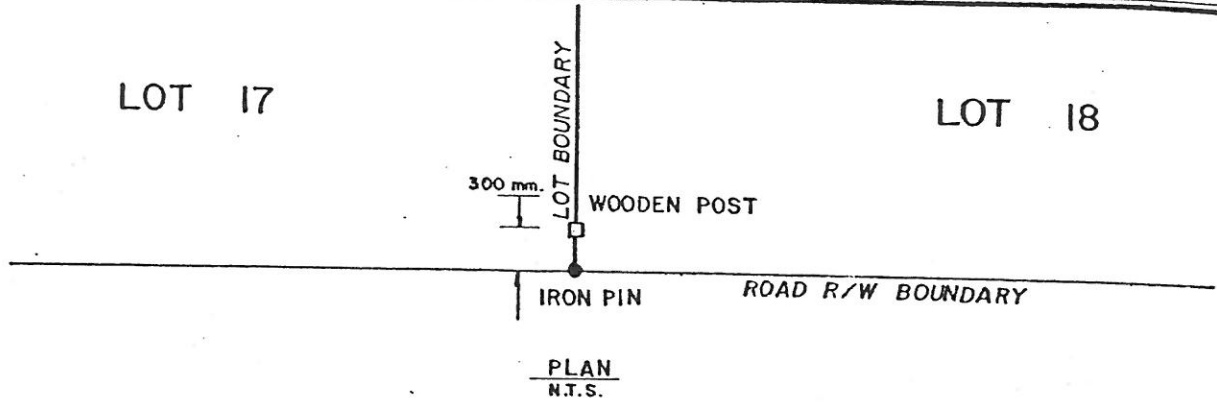
Classification	W = width
RLU 50	7.5 m
RCU 60	8.0 m
RCU 80	9.5 m



STEWART, WEIR & Co.
METRIC

LOT 17

LOT 18



FRONT VIEW
N.T.S.

NOTES

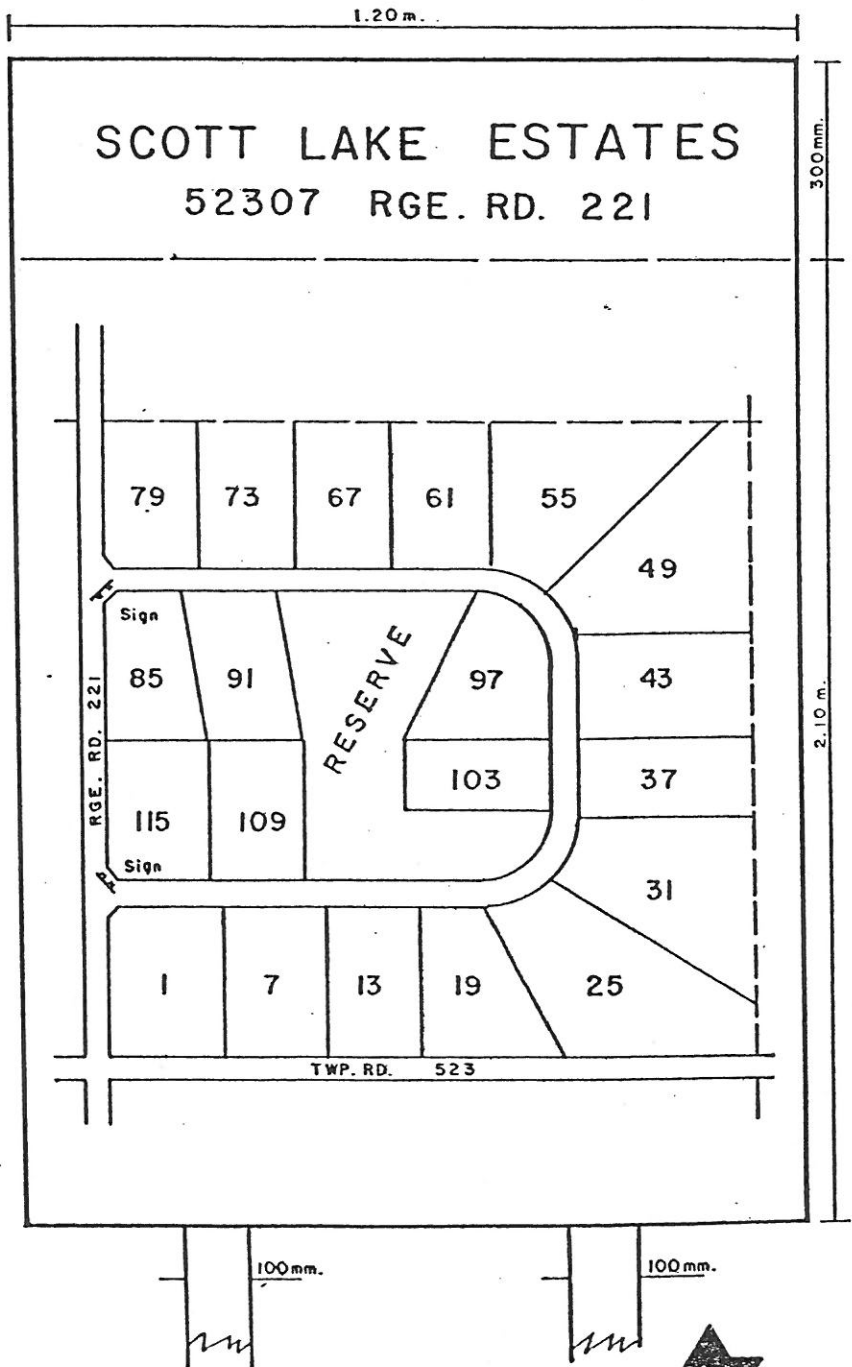
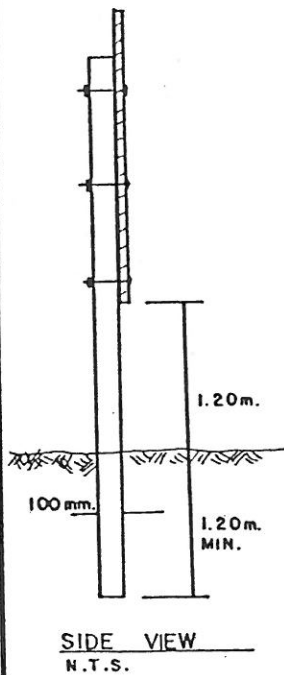
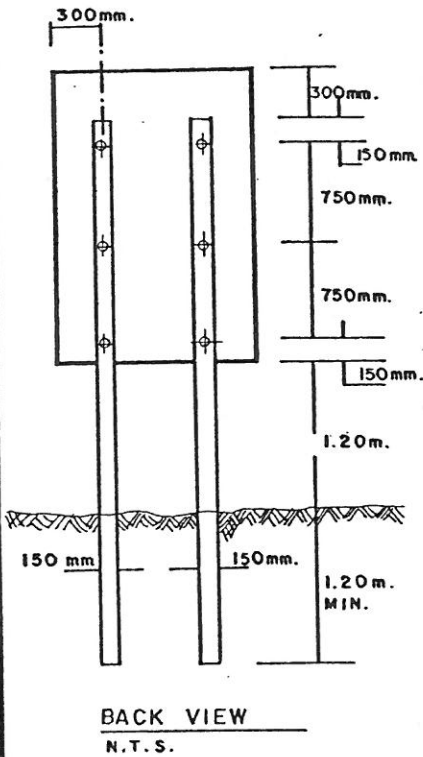
- (1) POST 100mm.X100mm..PRESSURE TREATED CEDAR- PAINTED WHITE.
- (2) SIGN TO BE FASTENED BY 2- 6 X 3/8".BOLTS.
- (3) SIGN TO BE BLACK NUMERALS ON WHITE BACKGROUND.
- (4) MAINTENANCE OF SIGN IS THE RESPONSIBILITY OF LOT OWNERS.

LOT POST DETAILS



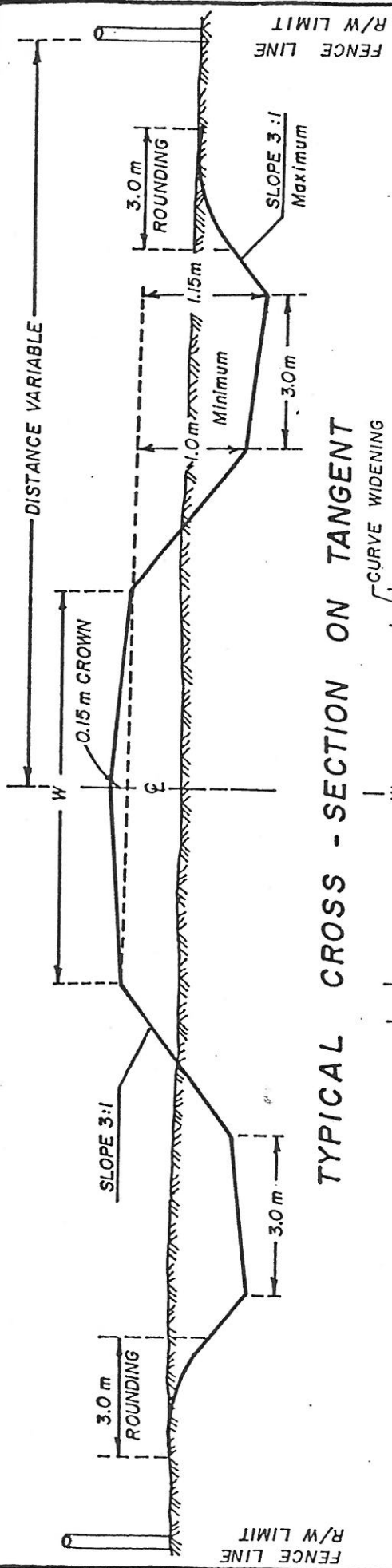
NOTES (MINIMUM REQUIREMENTS)

- (1) SIGN TO BE 1.20m. X 2.40m. X 19mm FIR PLYWOOD.
- (2) SIGN POST TO BE 100mm.X150mm. PRESSURE TREATED CEDAR-PAINTED WHITE.
- (3) POSTS TO BE A MINIMUM 1.20m. IN GROUND.
- (4) 2 POSTS PER SIGN.
- (5) SIGN TO BE BOLTED TO EACH POST WITH 3-8" X 3/4" GALVANIZED BOLTS.
- (6) SIGN TO BE LOCATED AT EACH ENTRANCE AS SHOWN ON DRAWING.
- (7) LETTERS FOR NAME TO BE BLACK AND AS LARGE AS POSSIBLE.

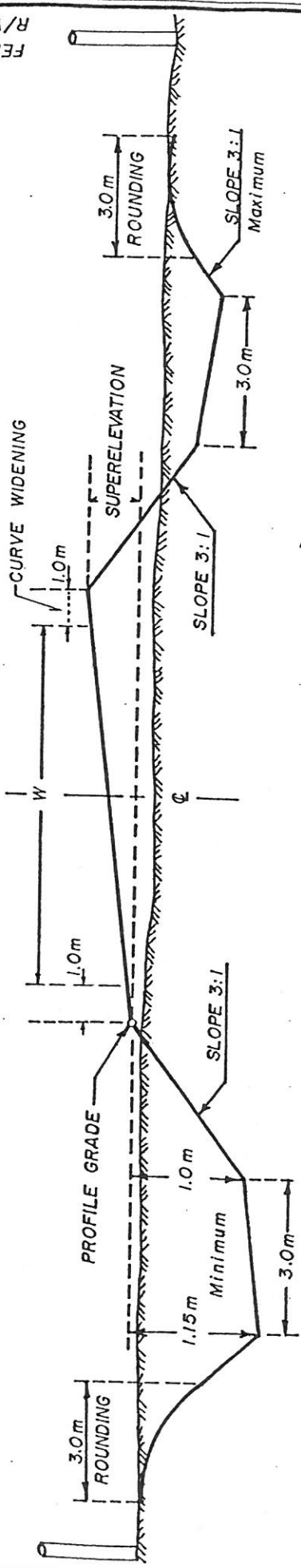


SUBDIVISION SIGNS





TYPICAL CROSS - SECTION ON TANGENT



TYPICAL CROSS - SECTION ON CURVE

EARTH CUT SECTION
 WIDTH OF DITCH - 3.0 m MINIMUM
 DITCH CROSS SLOPE - 0.05m/m

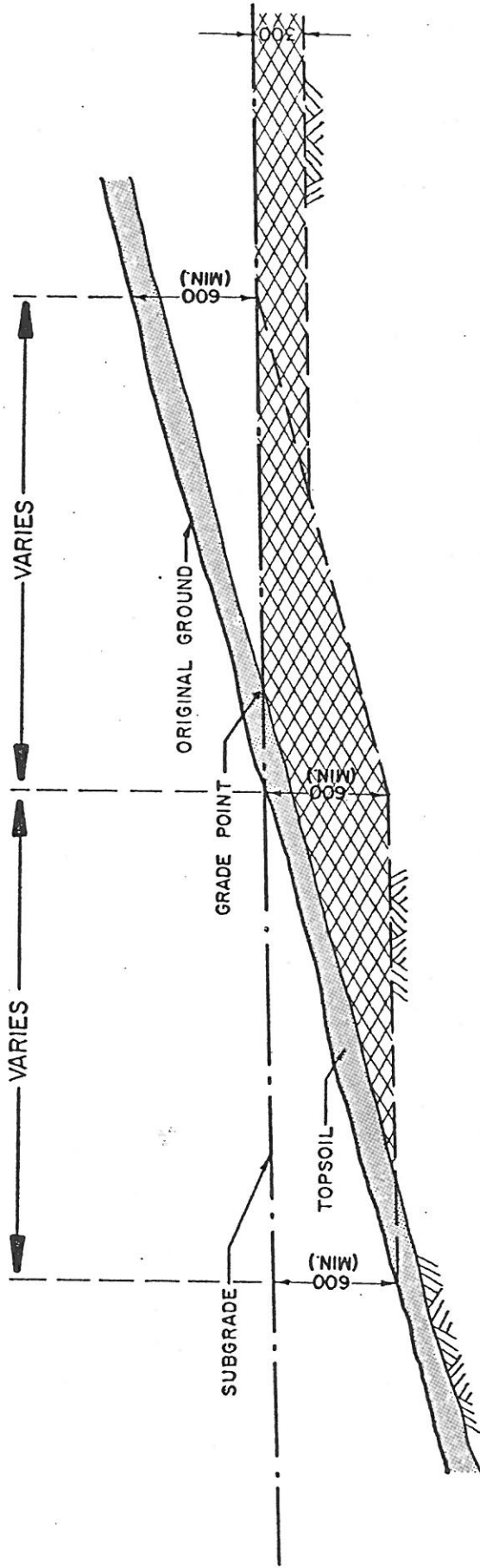
EARTH FILL SECTION
 3:1 SLOPE FOR AVERAGE FILL LESS THAN 3 METRES
 W = FINISHED PAVED WIDTH

STANDARD CROSS - SECTION

FOR
SUBDIVISION ROAD

Classification	W = width
RLU 50	7.5 m
RCU 60	8.0 m
RCU 80	9.5 m





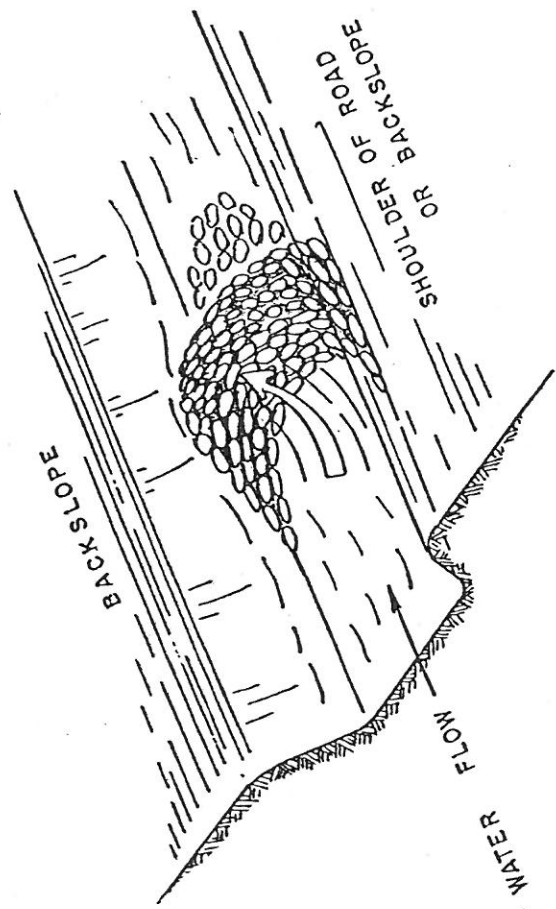
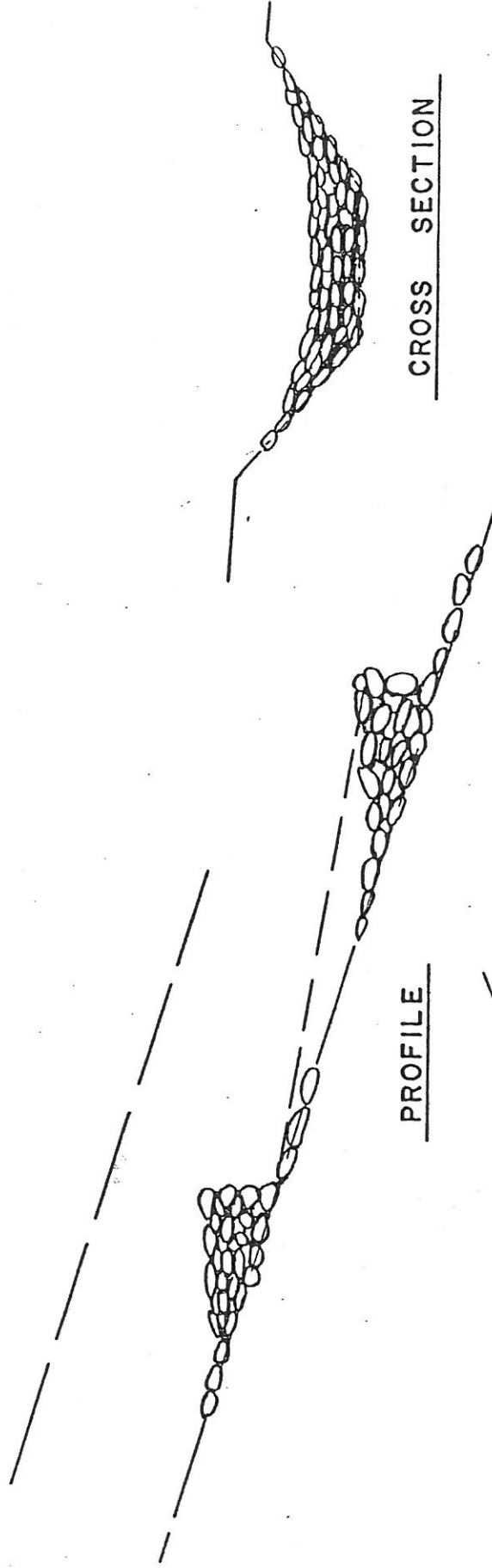
EARTH CUT & FILL METHODS AT GRADE POINTS

- NOTE:** 1. All unsuitable material shall be removed and disposed of.
2. The material shown by cross hatch shall be removed for full width of the cross-section, replaced with acceptable material and compacted in lifts not exceeding 150 mm to 95% of standard Proctor Density. The upper 300 mm shall be compacted to 100% of standard Proctor Density.
3. All dimensions are in millimeters unless otherwise shown.



METRIC
STEWART, WEIR & Co.

Rocks and boulders shall be selected as nearly cubical in form as practicable and of a size greater than 150 mm. The stones shall be placed with their beds at right angles to the slope, the larger stones being used in the bottom courses and the smaller stones at the top. They shall be laid in close contact so as to break joints and in such manner that the weight of the stone is carried by the earth and not by the adjacent stones.



ROCK DITCH CHECKS

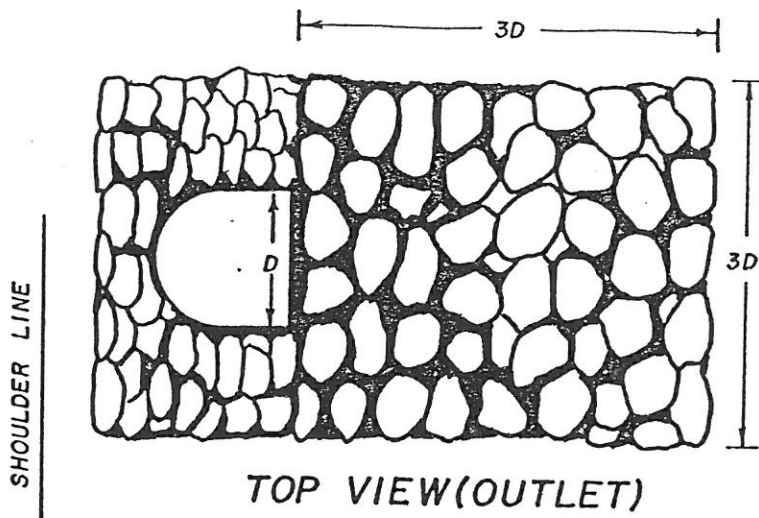


METRIC
STEWART, WEIR & Co.

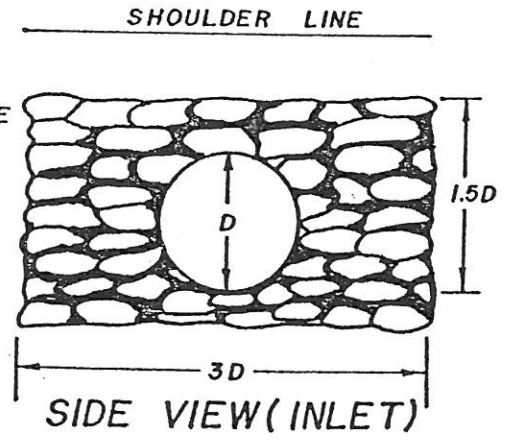
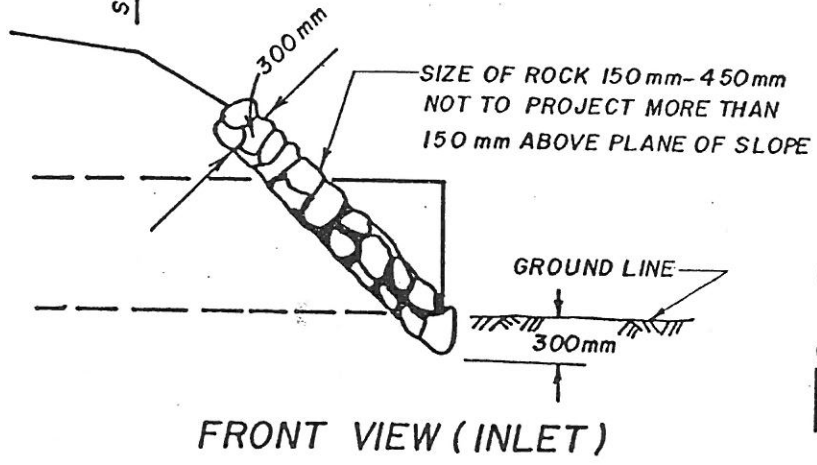
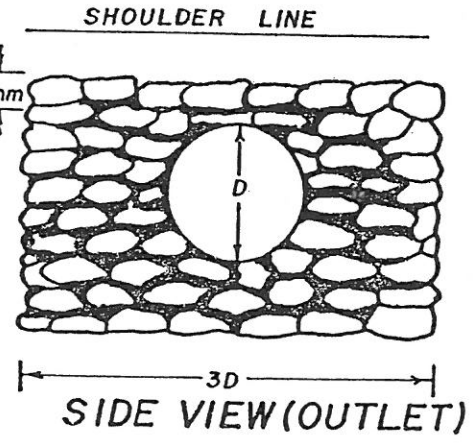
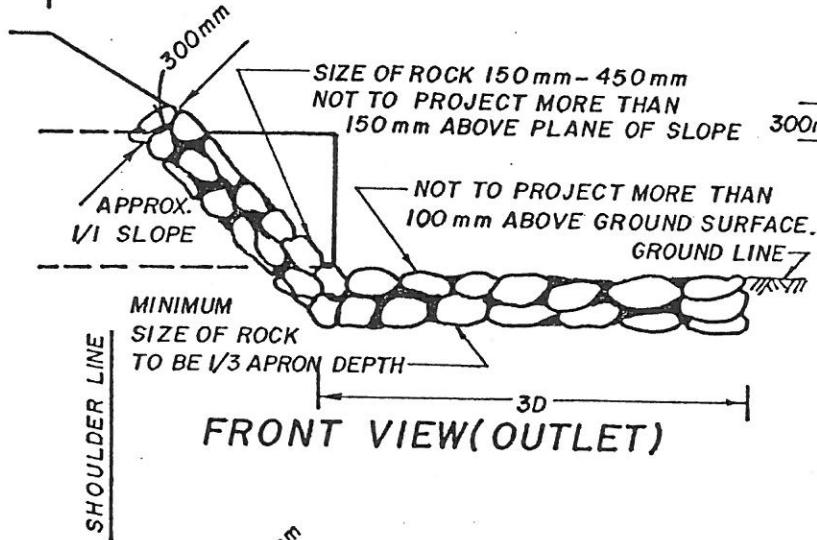
SCHEMATIC

PROFILE

CROSS SECTION



DIAMETER OF PIPE D	EQUIVALENT SIZE OF PIPE ARCH
400 mm	450 mm x 340 mm
500 mm	580 mm x 390 mm
600 mm	680 mm x 480 mm
800 mm	930 mm x 645 mm
1000 mm	1160 mm x 800 mm
1200 mm	1425 mm x 960 mm
1400 mm	1660 mm x 1090 mm
1600 mm	1870 mm x 1230 mm
1800 mm	2130 mm x 1400 mm



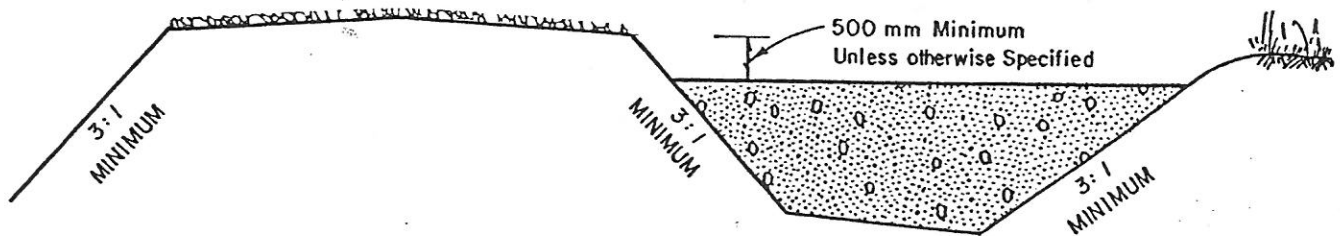
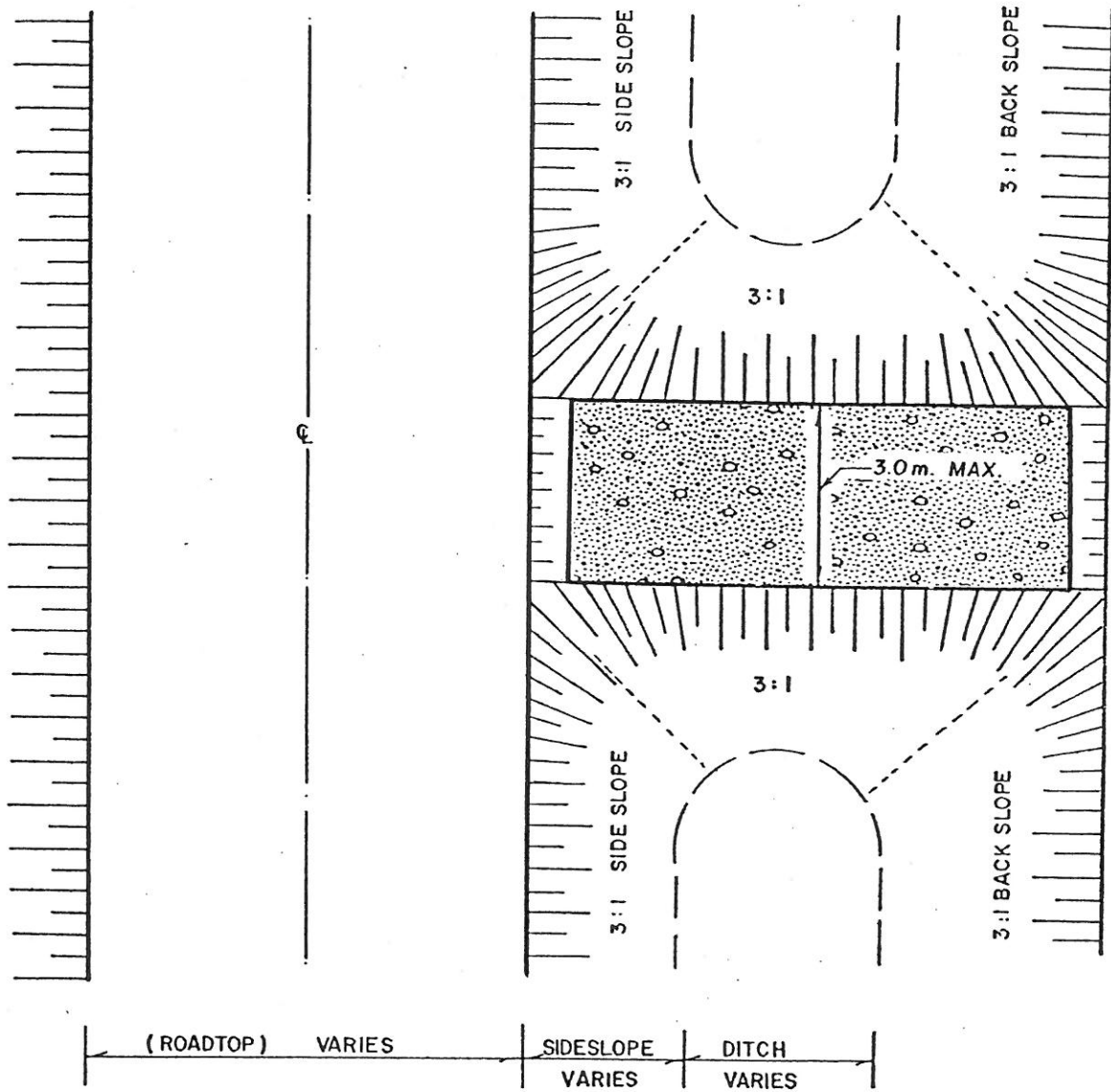
DIAMETER OF PIPE - D	400mm	500mm	600mm	800mm	1000mm	1200mm	1400mm	1600mm	1700mm	1800mm
* QUANTITY	1	2	3	5	10	13	16	20	28	33
APRON DEPTH	300mm	500mm			600mm			750mm		

*TOTAL QUANTITY OF RIP-RAP IN CUBIC METRES

HAND PLACED RIP-RAP FOR PIPE CULVERTS

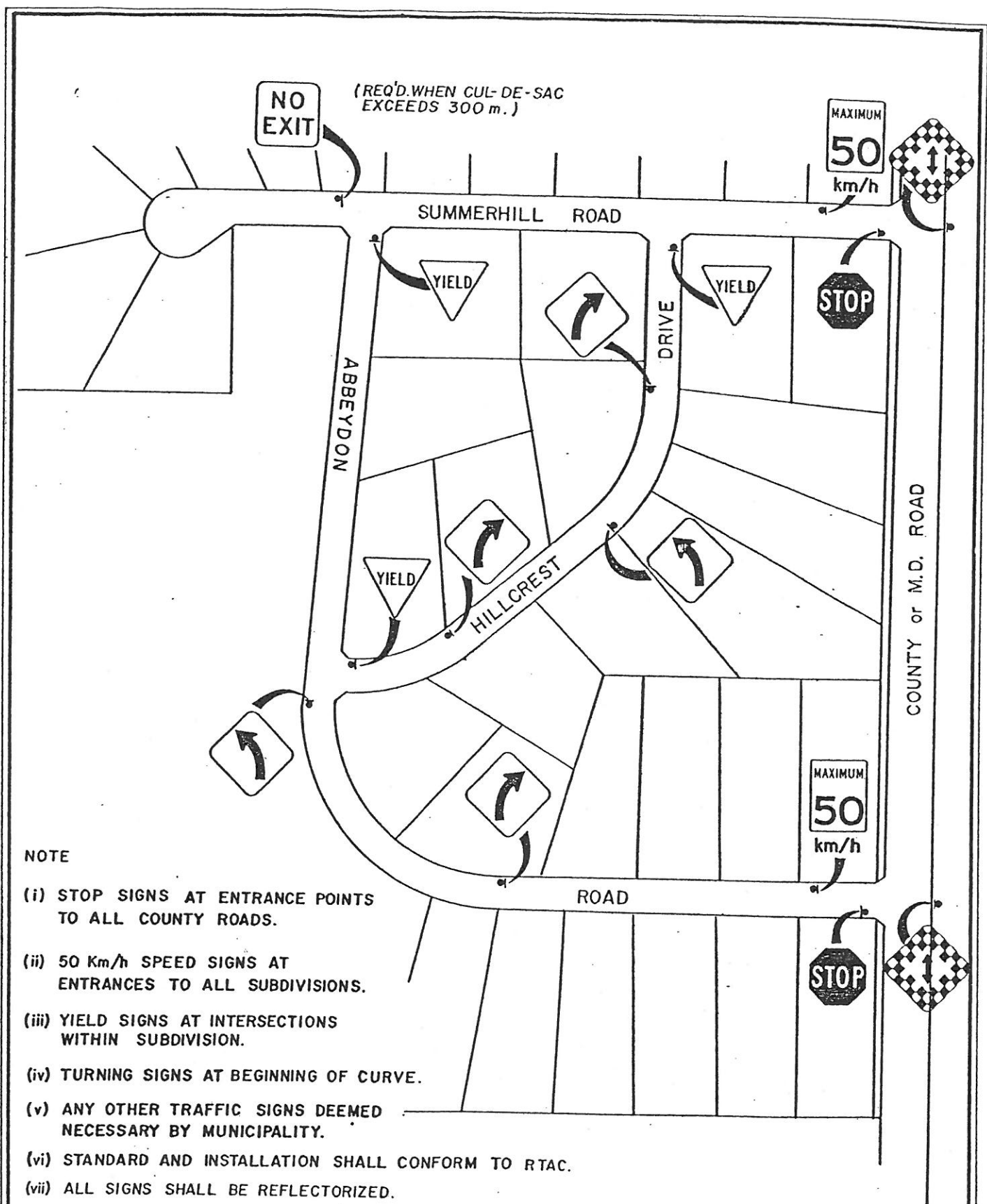


PLAN VIEW



TYPICAL CROSS-SECTION

TYPICAL VIEWS OF A DITCH BLOCK

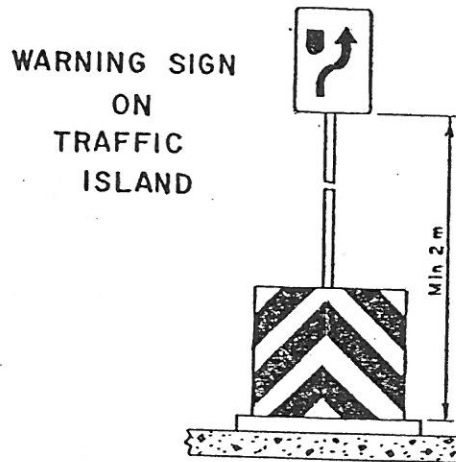
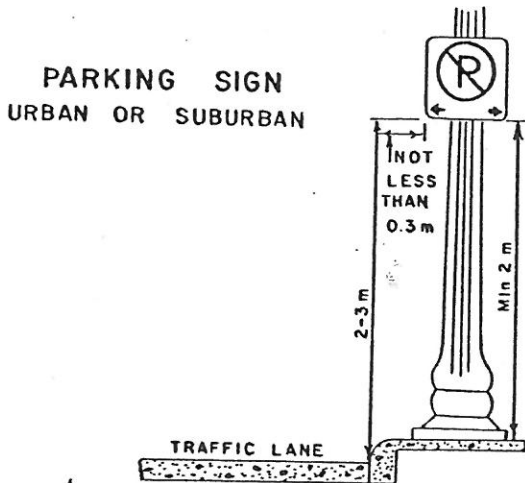
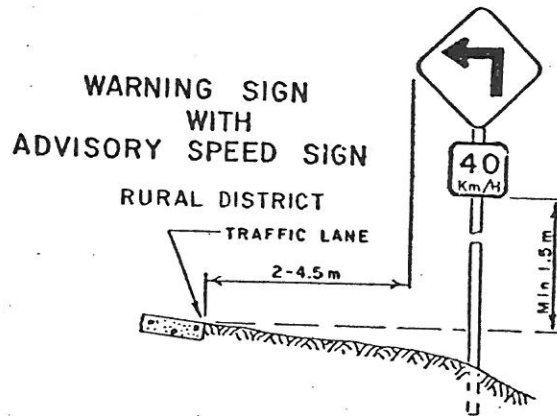
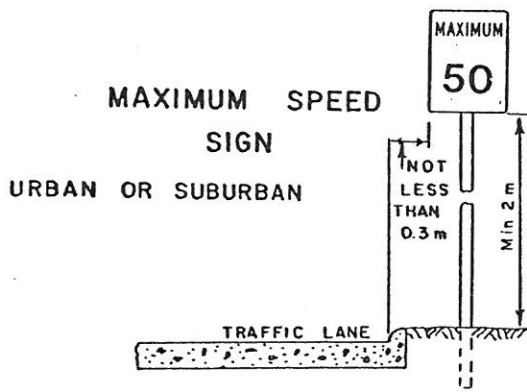
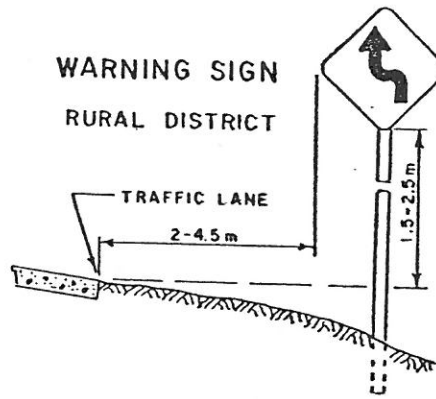
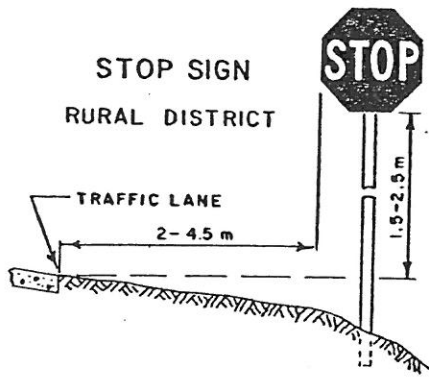


NOTE

- (i) STOP SIGNS AT ENTRANCE POINTS TO ALL COUNTY ROADS.
- (ii) 50 Km/h SPEED SIGNS AT ENTRANCES TO ALL SUBDIVISIONS.
- (iii) YIELD SIGNS AT INTERSECTIONS WITHIN SUBDIVISION.
- (iv) TURNING SIGNS AT BEGINNING OF CURVE.
- (v) ANY OTHER TRAFFIC SIGNS DEEMED NECESSARY BY MUNICIPALITY.
- (vi) STANDARD AND INSTALLATION SHALL CONFORM TO RTAC.
- (vii) ALL SIGNS SHALL BE REFLECTORIZED.

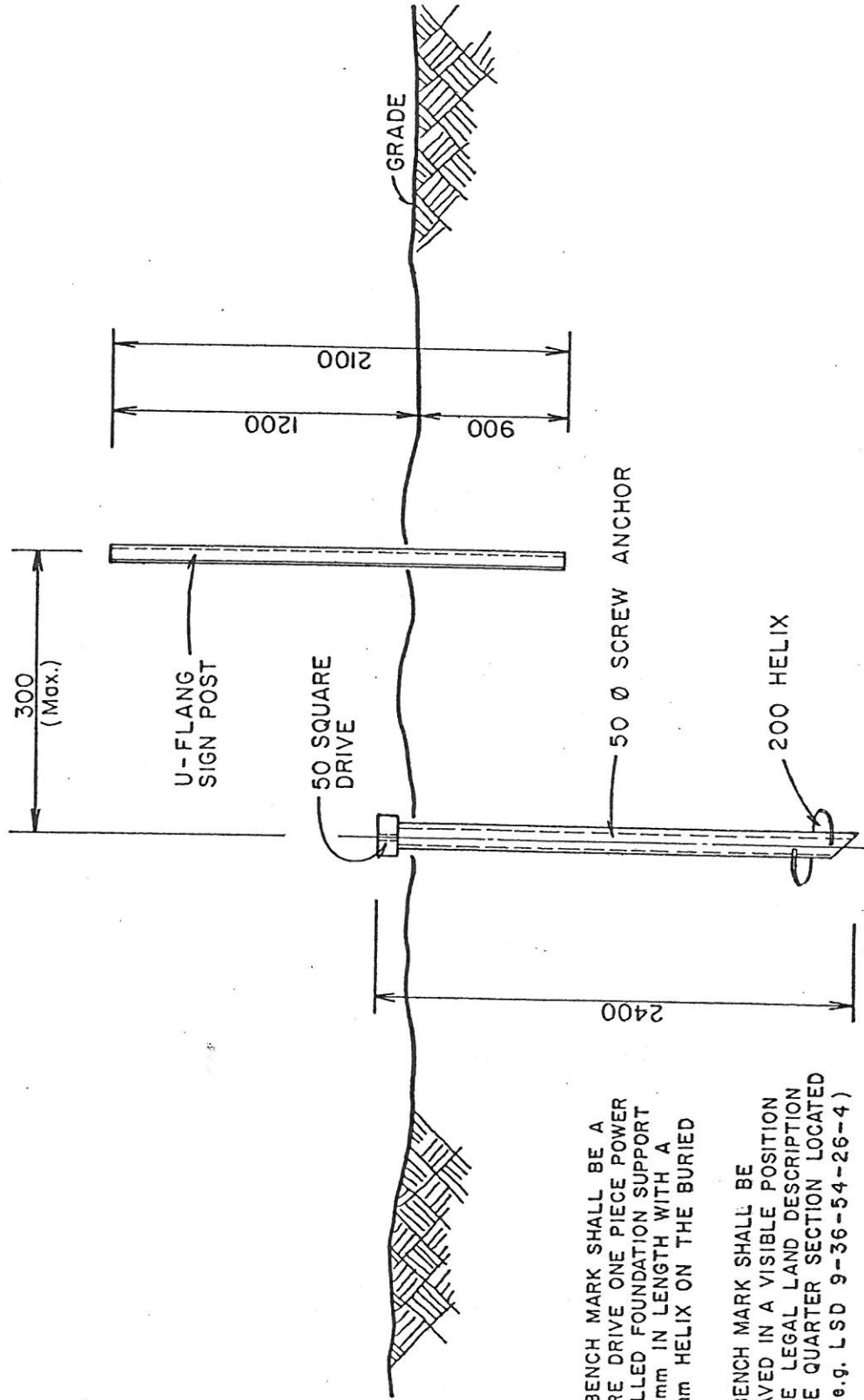
TYPICAL TRAFFIC SIGN LAYOUT

RURAL STANDARD



HEIGHT AND LATERAL LOCATION OF SIGNS

Typical installations



TYPICAL BENCH MARK INSTALLATION

NOTE: THE BENCH MARK SHALL BE A SQUARE DRIVE ONE PIECE POWER INSTALLED FOUNDATION SUPPORT 2400 mm IN LENGTH WITH A 200 mm HELIX ON THE BURIED END.

THE BENCH MARK SHALL BE ENGRAVED IN A VISIBLE POSITION BY THE LEGAL LAND DESCRIPTION OF THE QUARTER SECTION LOCATED IN. (e.g. LSD 9-36-54-26-4)

MARKER POST TO BE POSITIONED WITH THE OPEN U SECTION OF THE POST FACING THE NEAREST ADJACENT ROAD AND WITH THE POST LOCATED DIRECTLY BEHIND AND WITHIN 300 OF THE BENCH MARK.

ALL DIMENSIONS ARE IN MILLIMETERS.



STEWART, WEIR & Co.

(NAME OF OWNER)

In the Province of Alberta, hereinafter called the "Grantors" being registered owner of an estate in fee simple, in all those certain parcels or tracts of land situated in the Province of Alberta, and being part of

(LEGAL DESCRIPTION OF PROPERTY THROUGH
WHICH THE RIGHT OF WAY PASSES)

DO HEREBY pursuant to an agreement between the Grantors and the County of _____ or M.D. of _____ hereinafter called the "Grantee", and in consideration of the covenants and conditions herein contained, grant and transfer unto the Grantee an exclusive easement across, and through all those portions of the above described land, required for right of way, for a drainage ditch coloured red, on a plan filed at the Land Titles Office for the North Alberta Land Registration District as Plan No. _____. (Reserving unto her Majesty all mines and minerals) for the purpose of maintaining and cleaning said drainage ditch, including the trimming and removal of all parts of trees interfering with the proper maintenance and operation thereto, on the following terms and conditions.

1. The said right, license, liberty, privilege and easement, shall be for as long a period as the Grantee, its successors, and assigns and any person or corporation to whom a franchise is granted by the Grantee desires and continues to use the drainage ditch through the right of way.

2. Upon the execution of those present and at all times hereafter, the Grantee or any person, firm or corporation to whom it has granted a franchise, may enter upon and occupy the right of way with its agents, servants, workmen and contractors, and with vehicles, machinery and equipment, for the purpose aforesaid.

3. The Grantors gives the Grantee a right of access to the said right of way for the purposes aforesaid, across the remainder of any land against which this easement is registered, provided that the said right of access shall only be used in the case of any emergency, and provided that the Grantee pays a reasonable compensation to the then owner of such property for any damage occasioned thereby.

4. The Grantors will not erect any building or structures upon, over or on the right of way without consent of the Grantee.

5. The Grantors agree that the Grantee performing and observing the covenants and conditions herein contained shall peaceably hold and enjoy all the rights, privileges, liberties, and covenants hereby granted without hindrance and interruptions, from the Grantors or any person or persons claiming by, through, under or in trust for them or any person or persons whomsoever.

6. The Grantee will at all times hereafter indemnify and keep the Grantor indemnified against all actions, claims and demands that may be lawfully brought or made against the Grantors by reason of anything done by the Grantee, its tenants, servants, workmen, employees or licensees, in the exercise of purported exercise of rights, licenses, liberties, privileges and easement hereby granted.

7. The Grantee agrees that it will make compensation to the Grantors for any and all damage that may be done to any buildings, fences or other structures belonging to the Grantors and arising out of or by reason of, or in the course of maintenance of the said drainage ditch.

8. The Grantors and Grantee mutually covenant and agree with each other:-

(a) That this agreement shall ensure to the benefit of and shall be binding upon the respective heirs, executors, administrators, successors, and assigns of the parties hereto.

(b) That wherever the singular or the masculine pronouns are used throughout this agreement, the same shall be construed as meaning the plural, the feminine, or the neuter, where the context or the parties so require.

(c) That this agreement and the covenants herein contained are and shall be covenants running with the land.

IN WITNESS WHEREOF the Grantor and the Grantee have signed and sealed this document this _____ day of _____ A.D., 19____.

(Grantee)
County of _____ per: _____
or M.D. of _____

(Grantor)
_____ per: _____

per: _____
per: _____

AFFIDAVIT OF EXECUTION

CANADA) I, _____ of the _____ of
PROVINCE OF ALBERTA) _____ in the Province of Alberta,
) Make Oath and Say:
TO WIT:)

THAT I was personally present and did see _____
named in the within instrument, who _____ personally known to me to be the
persons named herein, duly sign and executed at _____ of
_____ in the _____ and that I am the
subscribing witness thereto and _____ are in my belief of the full age
of eighteen years.

SWORN before me at _____)
in the Province of Alberta, Canada)
this _____ day of _____ A.D. 19____)

(Witness sign here)

