CITY STANDARDS
FOR
SITE PLANNING

April 1992
# TABLE OF CONTENTS

1.0 THE BASIC BEGININGS OF SITE PLANNING ........................................... 4

2.0 ADMINISTRATION OF SITE PLANNING ................................................. 4

3.0 PROCEDURES FOR PROCESSING SITE PLANS ........................................ 5

4.0 CONCEPTUAL PLANS ............................................................................ 6-11

5.0 LANDSCAPING
   5.1 Introduction ...................................................................................... 12
   5.2 Landscape Submission ....................................................................... 12
   5.3 Landscape Requirements .................................................................... 13
       5.3.1 Landscape Plan (Sample). ....................................................... 13
       5.3.2 Landscape Plan (Features) ...................................................... 13-17
   5.4 Tree Survey & Environmental Impact Study Requirements ............... 17
       5.4.1 Tree Survey Plan Requirements ............................................. 17
       5.4.2 Environmental Impact Study Requirements ............................ 18
   5.5 Landscape Details ............................................................................ 20
       5.5.1 Deciduous Tree Planting ......................................................... 21
       5.5.2 Coniferous Tree Planting ....................................................... 22
       5.5.3 Shrub Planting ........................................................................ 23
       5.5.4 Typical Solid Screen Wood Fence Details .............................. 24-25
       5.5.5 Typical Garbage Bin Enclosure ............................................ 26
       5.5.6 Black Vinyl Coated Chain Link Fence Detail .......................... 27
       5.5.7 Typical Brick Wall .................................................................. 28

6.0 FIRE DEPARTMENT & BUILDING CODE REQUIREMENTS ......................... 29
   6.1 Building Analysis Form .................................................................... 30
   6.2 Access to Building Face .................................................................... 31
   6.3 Location of Hydrant .......................................................................... 31-32
   6.4 Design Requirements for Access Routes .......................................... 33-34
   6.5 Emergency Access Post and Chain Details ....................................... 35
   6.6 Protection of a Fire Hydrant .............................................................. 36

7.0 ENGINEERING .................................................................................... 36
   7.1 SANITARY SEWERS ......................................................................... 36
       7.1.1 General .................................................................................. 36
       7.1.2 Manholes ............................................................................... 36
       7.1.3 Sewer Pipe ............................................................................ 36
       7.1.4 Slope of Sanitary Sewer Pipe .................................................. 37
   7.2 STORM SEWERS ............................................................................. 37
       7.2.1 General .................................................................................. 37
       7.2.2 Manholes ............................................................................... 38
       7.2.3 Sewer Pipe ............................................................................ 38
       7.2.4 Runoff Coefficients ................................................................. 38
       7.2.5 Rainfall Intensity Formula ....................................................... 38
       7.2.6 Slope of Storm Sewer Pipe ...................................................... 39
       7.2.7 Inlet and Outfall Structures ..................................................... 39
       7.2.8 Storm Water Detention ............................................................ 39
       7.2.9 Foundation Drains .................................................................. 39
       7.2.10 Silt Control ........................................................................... 39
7.3 WATERMAINS .................................. 40
  7.3.1 General .................................. 40
  7.3.2 Hydrant.. .................................. 40
  7.3.3 Minimum Cover ................................. 40
  7.3.4 Metering. .................................. 40
  7.3.5 Meter Pits .................................. 40

7.4 DRIVEWAYS & PARKING AREAS .............. 41
  7.4.1 General Standards for Surfacing. ............ 41
  7.4.2 Dimensions .................................. 41
  7.4.3 Pavement Design ............................... 41

7.5 Access Ramps .................................. 41
  7.5.1 Location and Design. .......................... 41
  7.5.2 Parking Requirement Tables .................... 42

7.6 SIDEWALKS AND CURBS ......................... 44

7.7 LOT GRADING .................................. 44

7.8 PROCEDURE FOR DEDICATING ROAD WIDENINGS AND
    DAYLIGHTING TRIANGLES ......................... 45

7.9 ENGINEERING DETAILS
    Sewer Service Connections for flexible pipe ........ 48
    Sewer Service Connections for rigid pipe .......... 49
    Manhole Benching Details .......................... 50
    Manhole Drop Structure ............................ 51
    Watermain Trench Cross-Section: Rigid and Flexible Pipe 52
    Sewer Trench Cross-Section: Rigid and Flexible Pipe 53
    Concrete Barrier Curb ................................ 54
    Concrete Sidewalk .................................. 55
    Joints at sidewalk openings .......................... 56
    Sidewalk Ramps .................................... 57
    Concrete Sidewalk ................................. 58
    Driveway Entrance with Boulevard ................... 59
    Urban Private Entrance combined Concrete Curbs & Sidewalk 60
    Hydrant Installation ............................... 61
    Protectus III Meter Pit Specifications .............. 62
    Fire Service Turbine Meter Pit Specifications .. 63
    Tru/Flow Compound Meter Pit ........................ 64
    Meter Pit Specifications for 40 mm (1 1/2") and 50 mm (2") Meters. 65
    Silt Control Fence Detail ........................... 66
1. THE BASIC BEGINNINGS OF SITE PLANNING

Prior to the creation of any Site Plan you should not only familiarize yourself with the size and shape of the site but also have regard to the following matters or features:

1. Any special or unique features (i.e. historical).
2. Watercourses, trees or woodlot preservation, wetlands and hazardlands.
3. Extreme differences in ground elevations.
5. Wind & sun movements.
6. Traffic movements, existing driveways (on & off site) parking areas, road widenings & turning lanes.
7. Fencing, lighting, garbage locations, utility poles.
8. Fire routes, hydrants, siamese connection locations.
10. Building orientation (passive & active areas).
11. Effects of scale & massing of the proposed building on adjoining lands.
12. Maintaining character of the general area.

Having identified those features and having regard to the matters expressed and any additional information collected you may begin developing your concept plans.

NOTE: The greater sensitivity of your development should be towards those uses bordering your site. This will weigh heavily during the consideration of a Site Plan Review. Through site planning most objectives can be attained on and off the site.

2. ADMINISTRATION OF SITE PLANNING

The Site Plan Technical Committee is composed of representatives from Planning, Municipal Works, Parks & Recreation, Buildings & Inspections and Fire Departments.

Purpose & Activity of Committee:

Assist the applicants and review developments to ensure that:

(a) all City, Regional and Provincial standards and policies are maintained.
(b) a safe site environment is provided.
(c) an attractive, functional and sensitive project is developed.
(d) maintenance of the site is provided.
(e) all agreements and provisions are provided by the applicant to the satisfaction of the City.
3. PROCEDURES FOR PROCESSING SITE PLANS

(a) **Contact Department** - Contact the Buildings & Inspections Department to discuss procedures and obtain zoning information, the Site Plan Policy and the City Standards for Site Planning.

(b) **Prior Consultation** - Prior to the site plan application being made all preliminary concept layouts should be submitted to the Building Department for review by the Site Plan Technical Committee. The Site Plan Technical Committee will, in turn, advise with respect to preferred alternatives and/or suggested modifications. The concept plans should show all significant and dominant site features (i.e. water courses, trees, large grade changes) which promote good site planning.

(c) **Site Plan Application** - Once a preferred concept plan has been determined the applicant can proceed to prepare a formal site plan submission. Application for the review of a proposed site plan is made by submitting the site plan and the application form together with the appropriate fees and all supporting data.

(d) **Site Plan Review** - The total submission and studies will be reviewed for completeness and conformity with various Municipal, Provincial and Regional documents. The applicant will be advised of the suitability of the proposed plans and/or of any minor modifications and additional information required.

(e) **The Site Plan Agreement** - A final set of plans will be submitted with any remaining information required for the preparation of the Site Plan Agreement. The formal plans will be signed by the City and the applicant or, in the case of a company, a recognized officer of that company for presentation to Council.

(f) **Council approval** - The plans will be presented to Council for approval. The approved site plan(s) and the signed Agreement can be registered then issuance of the building permit can proceed. Any failure on the part of the Municipality to grant approval of the site plans may be appealed to the O.M.B. as permitted by the Planning Act (section 40).
4. CONCEPTUAL PLANS
Generally, Concepts 'A' and 'B' are reasonably good site plans as they provide good separation distance from abutting uses and will be less influenced or adversely impacted upon by these uses by adding additional buffering and landscaping. The improved site planning difference between Concepts 'A' and 'B' is that Concept 'B' has slightly increased the separation between the parking lots and the residential building. It also provided more effective landscaping permitting the residents an alternate choice of amenity area rather than just the rear yard.
Concept 'A' is a development where it was decided that the buildings would be located first with the balance of the site design to follow. The design resulted in inefficient parking areas and driveways as well as the need to provide underground parking. By placing the development at the streetline, its mass provided no opportunity to bring the project to a pedestrian scale. Concept 'B' increased the building setback from the street and brought the development to a pedestrian scale, improved landscaping significantly as well as improved the parking arrangement to the extent that the underground parking was not required.
The improved benefits that Concept 'B' has over Concept 'A' are quite obvious. The challenge is to take a very poor development which resulted from the location of the existing building and attempt to compromise off-site elements which stress the site as well as understanding how the existing development may have stressed the abutting developments.

Concept 'B' used site planning to improve the plan and reduce the various impacts as follows:

- the long unattractive wall of the existing building was further reduced by Concept 'B'
- some building setback from the existing parking lot was attained and now some buffering and landscaping may be possible rather than having a further blank wall adjacent to the parking lot
- a major improvement was made to the front yard setback to maintain a good streetscape
- Concept 'B' produced a more interesting building design on the exterior as well as in the interior of the apartment
5. LANDSCAPING

5.1 INTRODUCTION

The Landscape Approval Process is administered by the City of Niagara Falls, Buildings & Inspections Department as part of the overall Site Plan Approval Process. The Parks & Recreation Department's landscape design staff ensure the landscape requirements established by the Site Plan Technical Committee are properly detailed either on the Site Plan or the Landscape Plan. This process also ensures that the landscape contractors are provided with adequate information to properly construct the landscape works.

WHEN IS A 'LANDSCAPE PLAN' REQUIRED?

Site Plan applications with a gross lot area over 250 square metres must submit a "Landscape Plan" as part of their application. Applications with a gross lot area of less than 250 square metres can provide the "Landscape Details" on the proposed "Site Plan".

PRELIMINARY DISCUSSION OF LANDSCAPE DESIGN

Although not a requirement, it is to the applicants' benefit to review the project landscape design concept with the City's Site Plan Technical Committee. Contact Buildings & Inspections Department 416-356-7521.

5.2 LANDSCAPE SUBMISSIONS

A "Landscape Plan" submission can only be formally processed after a satisfactory Site Plan has been received by the Buildings & Inspections Department.

STEP 1

Submit five (5) Landscape Plans including any necessary details, specifications and building elevations to the Buildings & Inspections Department (folded to 21.6 cm x 29.2 cm - 8 1/2" x 11" size).

STEP 2

The Parks & Recreation Department's landscape design staff will review the landscape design and forward all comments or approval to the Buildings & Inspections Department for distribution to the applicant and consultants.

STEP 3

If the landscape designs are found to be acceptable the applicant will be required to submit eight (8) folded sets of landscape plans as part of the Site Plan final submission for approval and distribution.

STEP 4

Prior to any construction on the applicant's site the existing vegetation to be preserved must be protected with snow fence hoarding beyond the "drip line" of the vegetation to the satisfaction of the Buildings & Inspections Department. All snow fence hoarding is to be maintained in good condition by the owner for the remainder of the construction period.
5.3 LANDSCAPE DESIGN REQUIREMENTS

All landscape design requirements must be shown on either the proposed "Site Plan" or the "Landscape Plan" as indicated in item 5.1. A Landscape Plan (sample) is shown in item 5.3.1 including specific features which must be shown in the Landscape Plan or the Site Plan A description of these features is as follows:

5.3.1 LANDSCAPING PLAN (SAMPLES)

5.3.2 LANDSCAPE PLAN FEATURES

A  PLAN LIST
B  LANDSCAPE DETAILS
C  ENTRY LANDSCAPE FEATURE
D  BUILDING FOUNDATION PLANTING & PEDESTRIAN FLOW
E  BUFFER TREATMENT
F  NOTE FOR PROTECTION OF EXISTING VEGETATION
G  GENERAL LANDSCAPE NOTES
H  TITLE BLOCK FORMAT
I  NOTE TO CERTIFY CORRECT GRADING & DRAINAGE
J  GENERAL COMMENTS REGARDING BUILDING & LANDSCAPE DRAWINGS
K  BUILDING
5.3.2 LANDSCAPE PLAN FEATURES

The following landscape features are to be shown on the Landscape Plan or Site Plan (refer to drawing "sample" item 5.3.1).

A PLANT LIST

A detailed plant list is to include Latin name, common name, quantity, key letter, size of the plant, condition of the root system (wire basket, burlap, potted, bare root, etc.) and planting remarks.

B LANDSCAPE DETAILS

Complete and acceptable details for all landscape features and material including deciduous and coniferous tree planting, shrub planting, boulder placement, paving, fencing, retaining walls, play ground, benches.

C ENTRY LANDSCAPE FEATURES

All vehicular entrances into the site shall be clearly defined with special fencing, shrub beds and tree planting details. Entrances need to stand out in the landscape design to draw the attention of the motorists and pedestrians entering the site.

D BUILDING FOUNDATION PLANTING & PEDESTRIAN FLOW

The planting selected for the base of the buildings shall relate to the colour of the building facade, location of doors and windows and the future size of the mature plant material. Building entrances shall be enhanced with paving material that will compliment the architectural materials of the entrances. Pedestrian pathways shall flow from street lines and parking area to the building entrances.

E BUFFER TREATMENT

A minimum buffer width of 1.5m must be shown on the Landscape Designs and be detailed using, decorative fencing, berming (no greater than 33% slopes), tree and shrub planting. The main focus of the buffer zone is to screen the parking lot area from the adjacent streets and neighbouring land uses.

When protection to adjoining lands are required, a buffer strip shall be provided and maintained by the owner of the lot in accordance with the following provisions.

(a) Every buffer/planting strip shall have a minimum width of 1.5m and may be in addition to any required yard(s) depending on design.

(b) Be provided along any one or more lot lines.

(c) Be completely contained on the lot or within the zone boundary.

(d) Shall not be located within 2.5m of any street line.

(e) Every buffer/planting strip shall consist of fencing and a continuous unbroken, unpierced planting of hedges, shrubs, trees, the ultimate height of which is not less than 2.0m and all of which are protected by vehicle curb or barriers.

(f) The maximum height of the said planting strip, except for trees, shall not be greater than 2.5m and not less than 1.2m above the adjoining ground level except where a lesser height than 2.5m and 1.2m is specified in the Zoning By-law which shall govern.
NOTE FOR PROTECTION OF EXISTING VEGETATION

If the applicants site has existing vegetation worthy of preservation the following note shall be placed on the Landscape Plan or Site Plan:

a) All existing trees which are to remain shall be fully protected with hoarding, i.e. snow fencing, erected beyond their "drip line" prior to and during construction, to the satisfaction of the Building & Inspections Department. Groups of trees and other existing plantings to be protected, shall be treated in a like manner with hoarding around the entire clump(s). Areas within the protective fencing shall remain undisturbed and shall not be used for the storage of building materials or equipment.

b) No rigging cables shall be wrapped around or installed in trees and surplus soil, equipment, debris or materials shall not be placed over root systems of the trees within the protective fencing. No contaminants will be dumped or flushed on feeder roots of existing trees.

c) The developer or his/her agents shall take every precaution necessary to prevent damage to trees or shrubs to be retained.

d) Where limbs or portions of trees are removed to accommodate construction work, they will be removed carefully in accordance with the accepted arboricultural practice.

e) Where root systems of protected trees are exposed directly adjacent to or damaged by construction work, they shall be trimmed neatly and the area backfilled with appropriate material to prevent desiccation.

f) Where necessary, the trees will be given an overall pruning to restore the balance between roots and top growth or to restore the appearance of the trees.

g) Trees that are required to be preserved and have died or have been damaged beyond repair, shall be removed and replaced by the owner at his own expense with trees of a size and species as approved by the Buildings & Inspections Department.

h) If grades around trees to be protected are likely to change, the owner shall be required to take such precautions as dry welling, retaining walls and root feeding to the satisfaction of the Buildings & Inspections Department.

GENERAL LANDSCAPE NOTES

General notes include the following:

a) Where base information obtained from (identify source).

b) Verify all discrepancies of measurements or material specifications to the project manager/consultant.

c) Contractor is responsible to verify the location of all utilities prior to construction.

d) Owner to verify all property boundary locations. Boundary of property is to be identified with "SIB'S" Standard Iron Bars at all corners along the perimeter of the site.
TITLE BLOCK FORMAT
The following features shall be placed on the title block:

a) Key plan at a scale of approximately 1:10,000 indicating the exact location of the site surrounding streets and the direction of north.

b) Showing symbols for proposed vegetation, contours, spot elevations, catchbasins, parking areas and buildings. Property boundaries, utility lines, and other design features as necessary to clearly identify proposed construction.

c) Name of Project with "Site Plan Number".

d) Name of drawing - "Landscape Plan".

e) Scale of drawing, drawn by, date.

f) Drawing no.

g) North arrow.

h) Consultants name, address, phone number.

NOTE TO CONFIRM AND CORRECT GRADING & DRAINAGE
Note to be placed on Landscape Plan/Site Plan

I hereby confirm that this landscape plan conforms to the site grading and drainage plan for this project, as submitted by the project's Consulting Engineer.

GENERAL COMMENTS REGARDING BUILDING AND LANDSCAPE DRAWINGS
Landscape plans are to include the following information:

(a) (i) Nature Features which are existing and those which the builder has designated for preservation, shall be indicated;

(ii) Existing contours;

(iii) Proposed contours;

(iv) Top of bank contours and bottom of bank contours of all water courses within the property;

(v) Adjacent road and properties surrounding the subject lands are to be adequately marked with proposed and existing spot elevations to show the slope of the land;

(vi) Proposed walls within the project boundaries are to be marked with "Top of Wall" and "Bottom of Wall" elevations;

(vii) Steps shall be shown indicating their number and size. Spot elevations are to be shown at the top and bottom of the steps;

(viii) Drainage flow arrows to indicate direction of drainage;

(ix) All catch basins and sub-drains shall be clearly marked with proposed spot elevations;
(x) Structures: Indicate building entrances and spot elevations at each entrance (door and garages) and show the finished ground floor elevations of all building.

(xi) Location and elevation of underground structures.

(b) Locations of walkways, parking lots, screens, protective fencing, exterior lighting, street furniture, hydrants, curbs, existing ground signs and all existing and proposed features.

(c) Plant Material is to be clearly located and labeled with a key system. A plant list is to include the full botanical name, common name, quantity, caliper, height, spread and special remarks.

(d) All existing trees to be preserved or removed are to be accurately located and clearly specified as to the type, diameter and condition on plan. If of a large caliper, they should be dealt with on an individual basis; otherwise, general areas of small trees or shrub growth may be shown.

(e) Type of surface materials.

(f) Type and location of all easements, daylighting triangles and road widenings.

(g) Recreation amenities: Adult and child facilities are to be included, fully designed and dimensioned.

(h) Show all existing and proposed street trees adjacent to the site.

(i) Adjacent land uses (school, commercial, residential).

K. BUILDING

The building must be clearly labeled as to use. (i.e. residential, commercial etc.) Show building entrance using solid triangles and windows using brackets along walls of building.

5.4 TREE SURVEY & ENVIRONMENTAL IMPACT STUDY REQUIREMENT

A tree survey and environmental impact study may be required as part of the site plan requirements which results from a Zoning Amendment, Committee of Adjustment decision or a Niagara Escarpment Commission application. Additionally if the subject lands have trees which are of a significant diameter and of a unique or rare species this section may apply.

5.4.1 TREE SURVEY PLAN REQUIREMENTS

The purpose of a Tree Survey Plan is to identify the existing vegetation on site and determine what can be preserved within the proposed site development.

The following information is generally required on the Tree Survey Plan (some items may not be pertinent to a particular project; other projects may require additional information).
5.4.1 VEGETATION INFORMATION
cont.
- location of each tree exceeding 100 mm D.B.H. (diameter at breast height);
- location of general areas of smaller trees or shrub growth;
- species of plant material;
- size of plant material;
- crown of tree;
- condition (state of health);
- quality of tree with regard to species;
- sensitivity of tree to development;
- indicate whether the tree is to be retained or removed. (State reasons if the tree is to be removed);
- endangered or threatened species (identify).

5.4.2 ENVIRONMENTAL IMPACT STUDY REQUIREMENTS
The purpose is to determine the environmental impact of the proposed development on the existing vegetation, and recommend ways to minimize the impact. The following information is generally required within an Environmental Impact Study. (Some items may not be pertinent to a particular project; other projects may require additional information).

SITE CONDITIONS

(a) VEGETATION INFORMATION
- location of each tree exceeding 100 mm D.B.H. (diameter at breast height);
- location of general areas of smaller trees or shrub growth;
- species of plant material;
- size of plant material;
- crown of tree;
- condition (state health);
- quality of tree with regard to species;
- sensitivity of tree to development;
- endangered or threatened species (specify).

(b) TOPOGRAPHY
- grading plan showing existing grades (spot elevations and contours);
- identification of slope percentages within the site;
- if applicable show the top of bank as approved by the Niagara Peninsula Conservation Authority and the City of Niagara Falls.

(c) HYDROLOGY
- surface drainage (may be indicated on the grading plan).

(d) SOILS
- soil type;
- contaminate.

(e) CLIMATE
- prevailing winds;
- sun exposure.
5.4.2 (f) OTHER ITEMS

cont.

- existing zoning, services and utilities, circulation routes, structures and buildings;
- Conservation Authorities requirements and restrictions;
- any other constraints affecting the site.
5.5 LANDSCAPE DETAILS

5.5.1 Deciduous Tree Planting
5.5.2 Coniferous Tree Planting
5.5.3 Shrub Planting
5.5.4 Typical solid screen wood fence (4 types)
5.5.5 Typical garbage bin enclosure
5.5.6 Black vinyl coated chain link fence
5.6.7 Typical brick wall
5.5.1 DECIDUOUS TREE PLANTING DETAIL

PRUNING SHALL CONSIST OF REMOVAL OF ONLY DEAD, DAMAGED OR INTERFERING BRANCHES. LEADERS ARE NOT TO BE CUT.

THE TREE TIE SHALL BE FASTENED AROUND THE TREE IN A FIGURE EIGHT USING WIRE AND RUBBER HOSE AS SPECIFIED.

PARK PLANTINGS SHALL USE T-RAIL IRON STAKES 37 x 37 x 5mm. (STREET PLANTINGS SHALL USE 50 x 50mm WOOD STAKES)

ANIMAL GUARD WHERE REQUIRED.

50mm BARKCHIP MULCH

CUT AND REMOVE BURLAP FROM TOP 1/3 OF ROOT BALL

CONSTRUCT TOPSOIL SAUCER AROUND TREE BASE

EXISTING TOPSOIL

PLANTING SOIL MIXTURE TO CONSIST OF EXISTING NATIVE MATERIAL IN A FRIABLE CONDITION FREE OF LUMPS, STONES, ETC. BACKFILLED SOIL TO BE COMPACTED TO PREVENT AIR POCKETS AND SETTLEMENT.

SCARIFY SURFACE OF SUBSOIL PRIOR TO PLANTING.

NOTES

TREES UNDER 70mm CALIPER REQUIRE 2 STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
WHEN PLANT MATERIAL IS SUPPLIED IN WIRE BASKETS THE ENTIRE BASKET WILL BE REMOVED FROM THE PIT.
SET TREE 50mm HIGHER THAN SURROUNDING GRADE TO ALLOW FOR SETTLEMENT.

THE ABOVE DETAIL DOES NOT REPRESENT ANY SPECIFIC SPECIES.
ALL MEASUREMENTS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
5.5.2 CONIFEROUS TREE PLANTING DETAIL

THE TREE TIE SHALL BE FASTENED AROUND THE TREE IN A FIGURE EIGHT USING WIRE AND RUBBER HOSE AS SPECIFIED.

PARK PLANTINGS SHALL BE T-RAIL IRON STAKES 37 x 37 x 5mm.

STREET PLANTINGS SHALL USE 50 x 50mm WOOD STAKES)

ANIMAL GUARD WHERE REQUIRED.

CUT AND REMOVE BURLAP FROM TOP 1/3 OF ROOT BALL.

50mm WOODCHIP MULCH

CONSTRUCT TOPSOIL SAUCER AROUND TREE BASE.

EXISTING TOPSOIL

PLANTING SOIL MIXTURE TO CONSIST OF EXISTING Native MATERIAL IN A FRAILE CONDITION FREE OF LUMPS, STONES, ETC. BACKFILLED SOIL TO BE COMPACTED TO PREVENT AIR POCKETS AND SETTLEMENT.

SCARIFY SURFACE OF SUBSOIL PRIOR TO PLANTING.

TREES UNDER 1800mm REQUIRE 2 STAKES, TREES OVER 1800mm REQUIRE 3 STAKES.

WHEN PLANT MATERIAL IS SUPPLIED IN WIRE BASKETS THE ENTIRE BASKET WILL BE REMOVED FROM THE PIT.

SET TREE 50mm HIGHER THAN SURROUNDING GRADE TO ALLOW

FOR SETTLEMENT.

THE ABOVE DETAIL DOES NOT REPRESENT ANY PARTICULAR SPECIES.

ALL MEASUREMENTS IN MILLIMETERS UNLESS OTHERWISE INDICATED.
5.5.3 SHRUB PLANTING DETAIL

- Prune in such a manner as to preserve the natural character of the plant.
- Cut and remove burlap from top 1/3 of root ball.
- 50mm woodchip mulch
- Construct topsoil saucer around shrub base or shrub bed.
- Existing topsoil
- Planting soil mix as specified backfilled soil to be compacted to prevent air pockets and settlement.
- Scarify surface of subsoil prior to planting.

Planting method illustrated shall apply equally to bare - root and balled stock.
Set shrubs 50mm higher than surrounding grade to allow for settlement.
The above detail does not represent any particular species.
Shrubs planted in groups shall be set in continuous beds.
All measurements in millimeters unless otherwise indicated.
5.5.4 TYPICAL SOLID SCREEN WOOD FENCE DETAIL

- 38 x 89 Top cap
- 38 x 89 Runner on Edge
  - Top and Bottom
- 19 x 140 Boards
- 19 x 38 Battens
- 89 x 89 Post
- Galvanized Hangers
- Poured Concrete to be 27 Mpa at 28 Days Tested in Accordance with C.S.A. Minimum Standards
- Use No. 1 cedar or pressure treated red pine, jack pine or approved equal
- Use stain as specified
- Secure all lumber with galvanized nails
- All dimensions noted are in millimetres

Scalloped Edge
Blocking strip
5.5.4 TYPICAL SOLID SCREEN WOOD FENCE DETAIL

Decorative Post Cap
- alternative caps will be considered

38 x 89 Top Rail
38 x 38 Blocking
6.5 thk. x 38 wide Cedar Lattice Strips with 38 Gap Between Pieces
38 x 89 Rail
5.5.5 TYPICAL GARBAGE BIN ENCLOSURE

NOTES:
1. THE ARRANGEMENT SHOWN ON THIS PLAN MAY BE USED AS A GUIDE. ADDITIONAL STYLES AND MATERIALS MAY BE USED WHICH WILL ADD TO THE SURROUNDING ARCHITECTURE.
2. EXTERNAL DIMENSIONS MUST BE CHECKED AGAINST CONTAINER SIZE FOR DEVELOPMENT.
3. LOCATION OF SCREEN MUST BE APPROVED BY THE CITY.
4. GARBAGE VEHICLES REQUIRE A MINIMUM 26'-0" TURNING RADIUS.
5.5.6 BLACK VINYL COATED CHAIN LINK FENCE DETAIL

1. All mesh to be 9 gauge (3.6 mm) black vinyl coated, galvanized steel wire, knuckled at top and bottom; 50mm x 50 mm mesh.

2. All posts & rails to be galvanized steel pipe "standard weight", electrostatically painted black. They must conform to current specifications for black & hot dipped zink coated (galvanized) welded & seamless pipe for ordinary uses.

3. All required fittings & hardware to be of a suitable aluminum alloy or of a steel ductile iron, also painted black.
5.5.7 TYPICAL BRICK WALL

- Precast concrete cap each piece set with two vertical and two horizontal dowels.
- Hard fired brick with low moisture absorbancy.
- 10 mm. or 15 mm. rebar @ 900 mm. o.c.
- Corrosion resistant metal ties @ 900 mm. o.c. horizontal.
- 450 mm. o.c. vertical alternate courses.
- Ground line.
- Poured reinforced concrete foundation.

Dimensions:
- 1750 mm.
- 1800 mm. 27 courses
- 600 mm.
- 1200 mm.
- 225 mm.
6.0 FIRE DEPARTMENT and BUILDING CODE REQUIREMENTS

6.0.1 FIRE ACCESS ROUTES

Required fire access routes as indicated on site plans are to be added to the City of Niagara Falls Fire Route By-law. The by-law will be amended following Council's approval of the site plan. The owner is required to purchase signs (no parking - fire route) and post all required fire access routes.

6.1 BUILDING ANALYSIS FORM

The following Building Analysis Form must be completed and submitted to the Buildings & Inspections Department at time of site plan submission. This form will insure that the site design and location of building complies with Ontario Building Code.
6.1 BUILDING ANALYSIS FORM

ARCHITECT (OR ENGINEER) to fill out and return to the CITY OF NIAGARA FALLS-BUILDINGS & INSPECTIONS DEPARTMENT

THE 1990 ONTARIO BUILDING CODE (ONTARIO REG. 413/90) CAME INTO EFFECT ON OCTOBER 1, 1990. ANY APPLICATION, WHICH INCLUDES PLANS IN ACCORDANCE WITH THE PREVIOUS CODE MUST BE MADE PRIOR TO JANUARY 1, 1991.

CLASSIFICATION:

<table>
<thead>
<tr>
<th>Major occupancy</th>
<th>Building area(s) (like coverage)</th>
<th>Number of storeys</th>
<th>If mezzanine, state % area of building</th>
<th>Number of streets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of smoke evacuation if high rise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
<th>Permissible construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.2.</td>
<td>3.2.2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire resistance ratings designed for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) floor above basement HR</td>
</tr>
<tr>
<td>b) other floor assy. HR</td>
</tr>
<tr>
<td>c) roof HR</td>
</tr>
<tr>
<td>d) mezzanine HR</td>
</tr>
<tr>
<td>e) columns/loadbearing walls HR</td>
</tr>
<tr>
<td>f) tenant/occupancy separations HR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gross floor area</th>
<th>m² Defined</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Occupancy load</th>
<th>calculated designed for</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Fire Alarm System provided</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Spatial separation - verified</th>
<th>Actual verification may be required</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Barrier Free access provided</th>
<th></th>
</tr>
</thead>
</table>

| * (If occupant load designed for is other than that calculated from table 3.1.16.A, then a sign must be posted on site indicating the occupant load. It must also be verified in writing to this department). |

<table>
<thead>
<tr>
<th>Signature (Architect or Engineer)</th>
<th>Application No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Property Address</th>
</tr>
</thead>
</table>

Page 30
6.2 ACCESS TO BUILDING FACE

Access routes to the face of the building in which the principal entrance is located and to faces of the buildings which are required to be provided with openings for fire fighting access, must be located between 3 m and 15 m from the building face measured horizontally.

6.3 LOCATION OF HYDRANT

Access routes to every building are required to be designed so that there is an unobstructed path of travel from a fire department pumper to the fire department connection for the building, or where there is no fire department connection, from a fire department pumper to the principal entrance of the building.
6.3 LOCATION OF HYDRANT CONTINUED

The maximum path of travel from the principal entrance to a fire hydrant is 90 m for the buildings that are not equipped with a fire department connection. The path of travel from the fire department vehicle to the principle entrance or fire department connection must be unobstructed and cannot exceed 45 m.

Where a building is internally divided so that no internal access is possible between each section, exterior fire fighting access must be provided to each section of the building so that the maximum unobstructed path of travel to each section from a fire department pumper is not more than 45 m.
6.4 DESIGN REQUIREMENTS FOR ACCESS ROUTES

Where access is required to a building for fire department vehicles and is provided by a roadway or yard the following criteria apply to the design and construction of the access route.

(a) Minimum width 6 m
(b) Minimum centre line radius - 12 m
(c) Minimum overhead clearance - 5 m
(d) Maximum gradient change - 1:12.5 over at least 15 m
(e) Must support loads imposed by fire fighting equipment
   - Suraced with concrete, asphalt or other surface designed for year round accessibility
(f) Provide turn around facilities if dead-end exceeds 90 m
(g) Have direct connection to public thoroughfare

![Diagram of fire department access route with minimum width, centre line radius, overhead clearance, and gradient change requirements.]

THIS REQUIREMENT IS DESIGNED TO PREVENT THE VEHICLE FROM DRAGGING EITHER ITS BACK END OR MIDSECTION ON GRADE CHANGES

MAXIMUM SLOPE 1:12.5

MINIMUM 15 m LENGTH OF SLOPE

5 m VERTICAL CLEARANCE ABOVE ALL порTIONS OF ACCESS ROUTE

MINIMUM 6 m FIRE DEPARTMENT ACCESS ROUTE
6.4 DESIGN REQUIREMENTS FOR ACCESS ROUTES

DEAD-END GREATER THAN 90 m,
TURN AROUND FACILITY REQUIRED

DEAD-END LESS THAN 90 m,
TURN AROUND FACILITY NOT REQUIRED

PUBLIC THOROUGHFARE

R = 12 m MINIMUM

6.5 EXAMPLES OF TURN AROUND FACILITIES

FIRE ACCESS ROUTE

R: MINIMUM 12 m

D: DISTANCE DEPENDS ON
FIRE DEPARTMENT VEHICLE SIZE

MINIMUM 6 m

6 m MINIMUM

FIRE ACCESS ROUTE
6.5 EMERGENCY ACCESS POST AND CHAIN DETAIL

4" DIA
4'-0" HIGH
1/4" WALL STEEL PIPE

3/8" DIA. FORGED EYE BOLT (BOTH SIDES)
3/8" PROOF COIL CHAIN

CHAIN LINK FENCE POST

2" HL3 ASPHALT
12"X18" BRIGHT STEEL SAFETY BOARD

EXISTING GROUND

4'-0"

9" GRANULAR 'A' BASE

8" Poured CONCRETE

12'-0"

3'-0"

15'-0"

BAK'91
7.1.4. SLOPE OF SANITARY SEWER PIPE

In general, where site servicing with respect to a sanitary sewer is concerned, the standards in the Ontario Plumbing Code will apply.

However, where MOE approval is required, the more stringent requirements listed below must be followed.

The minimum design velocity at the peak flow is 0.76 m per second. Minimum slopes for sewer line to provide self-cleaning velocities are as follows:

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MINIMUM SLOPE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm</td>
<td>2.0</td>
</tr>
<tr>
<td>150 mm</td>
<td>1.0</td>
</tr>
<tr>
<td>200 mm</td>
<td>0.4</td>
</tr>
<tr>
<td>250 mm</td>
<td>0.35</td>
</tr>
<tr>
<td>300 mm</td>
<td>0.30</td>
</tr>
<tr>
<td>375 mm</td>
<td>0.23</td>
</tr>
<tr>
<td>450 mm</td>
<td>0.18</td>
</tr>
<tr>
<td>575 mm</td>
<td>0.14</td>
</tr>
<tr>
<td>600 mm</td>
<td>0.12</td>
</tr>
</tbody>
</table>

7.2 STORM SEWERS
7.2.1. GENERAL

(i) Manholes, catchbasins and any other appurtenances shall conform to the Ontario Provincial Standard Specifications and Drawings.

(ii) Where extensions of City main sewers form part of the development proposal, Ministry of Environment approvals will be required and drawings will be required in the standard plan/profile format as outlined in:

1. "Guide on Applying for Approval of Sewage Works"; MOE Publication
2. Checklist for Applications to Regional Municipality of Niagara for MOE Approvals

(iii) Where the internal services of the development require Ministry of the Environment approval, drawings will be required in the standard plan/profile format as outlined in:

1. "Guide on Applying for Approval of Sewage Works"; MOE Publication
2. Checklist for Applications to Regional Municipality of Niagara for MOE Approvals

(iv) A single catchbasin should drain an area up to an area of 930 square metres.

(v) Storm water will be allowed to enter a combined sewer system on a site specific basis. In cases where storm run-off is permitted to enter a combined sewer; all on-site catchbasins will be fitted with an EZ-Flow restrictor or approved equal in which the discharge opening is of a size no greater than 50 mm x 50 mm. The outlet pipe to the combined system shall be fitted with a PVC Flow Reducer with a maximum 100 mm diameter opening. The reducer shall remain in place until a suitable storm sewer is constructed on the street.

(vi) Internal storm sewer systems shall be designed to accommodate a 5 year return storm.

(vii) All efforts should be made through grading to outlet the major storm flows to the roadways.
7.2.2. MANHOLES

Manholes are required on all sewers over 150 mm in diameter at a maximum spacing of 106 m for sewers up to 450 mm and 150 m for sewers over 450 mm and at every change in alignment, grade or pipe size.

Manhole sizes shall be in accordance with OPSD 1004.01 as amended.

7.2.3. SEWER PIPE

The minimum size of a storm sewer is 200 mm in diameter provided the pipe has adequate capacity.

Pipe capacities shall be determined using Manning's Formula with n=0.013 for all smooth walled sewer pipe and n=0.024 for corrugated metal sewer pipe.

7.2.4. RUNOFF COEFFICIENTS

Storm sewers shall be designed to accept all drainage from the contributing catchment area. The values of runoff coefficients for various types of land use are as follows:

<table>
<thead>
<tr>
<th>TYPE OF LAND USE</th>
<th>RUNOFF COEFFICIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Churches</td>
<td>0.6</td>
</tr>
<tr>
<td>Commercial</td>
<td>0.8</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.7</td>
</tr>
<tr>
<td>Schools</td>
<td>0.4</td>
</tr>
<tr>
<td>Apartments</td>
<td>0.6</td>
</tr>
<tr>
<td>Townhouses</td>
<td>0.5</td>
</tr>
<tr>
<td>Semi-detached Residential</td>
<td>0.45</td>
</tr>
<tr>
<td>Single Family Residential</td>
<td>0.4</td>
</tr>
</tbody>
</table>

7.2.5. RAINFALL INTENSITY FORMULA'S

The following rainfall intensity formula's shall apply:

1) 5 year return storm
   
   \[
   \text{Intensity (mm/hr)} = \frac{2667}{t + 20}
   \]

2) 100 year return storm

   \[
   \text{Intensity (mm/hr)} = \frac{1264.57}{(t + 7.72)(0.7814)}
   \]

\[t = \text{time of concentration in minutes}\]
7.2.6. SLOPE OF STORM SEWER PIPE

The minimum design velocity for storm sewers is 0.80 metres per second. The following are the minimum slopes which shall be provided for storm sewers:

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MINIMUM SLOPE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm</td>
<td>1.0</td>
</tr>
<tr>
<td>150 mm</td>
<td>0.80</td>
</tr>
<tr>
<td>200 mm</td>
<td>0.60</td>
</tr>
<tr>
<td>300 mm</td>
<td>0.35</td>
</tr>
<tr>
<td>375 mm</td>
<td>0.25</td>
</tr>
<tr>
<td>450 mm</td>
<td>0.20</td>
</tr>
<tr>
<td>525 mm</td>
<td>0.144</td>
</tr>
<tr>
<td>600 mm</td>
<td>0.120</td>
</tr>
<tr>
<td>675 mm</td>
<td>0.102</td>
</tr>
<tr>
<td>750 mm</td>
<td>0.089</td>
</tr>
<tr>
<td>825 mm</td>
<td>0.080</td>
</tr>
<tr>
<td>900 mm</td>
<td>0.070</td>
</tr>
<tr>
<td>1050 mm</td>
<td>0.056</td>
</tr>
<tr>
<td>1200 mm</td>
<td>0.048</td>
</tr>
<tr>
<td>1350 mm</td>
<td>0.042</td>
</tr>
<tr>
<td>1500 mm</td>
<td>0.036</td>
</tr>
<tr>
<td>1650 mm</td>
<td>0.031</td>
</tr>
<tr>
<td>1800 mm</td>
<td>0.028</td>
</tr>
<tr>
<td>1950 mm</td>
<td>0.025</td>
</tr>
<tr>
<td>2100 mm</td>
<td>0.023</td>
</tr>
</tbody>
</table>

7.2.7. INLET AND OUTFALL STRUCTURES

Inlet and Outfall structures including headwalls shall be fully designed and submitted in detail.

Grates shall be provided on all inlet and outfall structures 600 mm in diameter and larger and shall be fully designed and detailed including locks where applicable.

7.2.8. STORM WATER DETENTION

When storm water detention is required, a detailed design must be submitted indicating that the site can be developed while, at the same time, providing the necessary detention areas. The design shall include the method of detention together with the volumes of storm water to be detained, drainage area plans, design flow calculations and the method of restricting the flow to the site. The maximum depth of ponding shall be 250 mm. All storm water detention systems will require Ministry of the Environment Approval.

When development takes place in areas where Flood Plain Mapping has been carried out, approval must be obtained from the Niagara Peninsula Conservation Authority.

7.2.9. FOUNDATION DRAINS

All existing and proposed foundation drains shall be connected to storm sewer if available or pumped to surface if no storm sewer is available. Refer to City of Niagara Falls drawing 1009.1.

7.2.10. SILT CONTROL
Silt control in accordance with the City of Niagara Falls drawing NF-219.2 as amended may be required along Municipal ditches and watercourses.

7.3 WATERMAINS

7.3.1 GENERAL

(i) Design data for watermains shall conform to the Ministry of the Environment Guidelines for the "Design and Sanitary Sewer Works, Storm Sewers, Water Distribution Systems and Water Storage Facilities" (July 1984 issue) and Regulation 815-84 of The Ontario Plumbing Code.

(ii) Where extensions of City watermains form part of the development proposal drawing will be required in the standard plan/profile format as outlined in "Guidelines for the Design of Water Distribution Systems" MOE Publication, May 1979 and City of Niagara Falls Drawing 1102.0 as amended.

(iii) Where the internal services of the development require Ministry of the Environment approval, drawings will be required in the standard plan/profile format as outlined in:


2. Checklist for Applications to Regional Municipality of Niagara for MOE Approvals.

(iv) Water services will be installed to the property line by the City at the developers cost. (contact City Water Works Department).

7.3.2 HYDRANT

All hydrants shall be equipped with a "Storz" connection. Hydrants shall be installed in accordance with OPSD 1105.01 as amended.

7.3.3 MINIMUM COVER

The minimum cover for any watermain or service is 1.5 metres.

7.3.4 METERING

Water metres will be required on all commercial and multi-residential developments. Water metres will be supplied by the City at the owner's cost and shall be installed by the owner's independent plumbing contractor.

7.3.5 METER PITS

Meter pits shall be required on a site specific basis and constructed in accordance with the City of Niagara Falls drawings 1107.1, 1107.2, 1107.3, and 1107.4 as amended.
7.4 DRIVEWAYS & PARKING AREAS

7.4.1. GENERAL STANDARDS FOR SURFACING

All driveways and parking areas shall be either asphalt paved or concrete paved surfaces and shall conform to the Ontario Provincial Standard Specification and Drawings.

7.4.2. DIMENSIONS

All driveway entrances shall be in accordance with OPSD 303.02. All parking areas will have a minimum slope of 0.5% and a maximum slope of 5%. All entrances used for garbage collection shall be designed with 9.4 metre centreline turning radius.

7.4.3. PAVEMENT DESIGN

City of Niagara Falls guidelines for asphalt pavement structures shall be adhered to; a cross section consisting of 300 mm of Granular "A" base compacted to 98% modified proctor density overlaid with 50 mm of HL8 asphalt and 25 mm of HL3 asphalt.

Pavement designs conforming to Ministry of Transportation "Structural Design Guidelines for Flexible Pavements and for Concrete Pavements" will be accepted.

7.5 ACCESS RAMPS

Ingress and egress to and from the required parking spaces and areas shall be provided by driveway ramps having the following widths measured perpendicular to the centre line of the driveway at the property line:

<table>
<thead>
<tr>
<th>Driveways to parking area</th>
<th>(two way traffic)</th>
<th>Max. 9m - Min. 7m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(one way traffic)</td>
<td>Max. 6m - Min. 4m*</td>
</tr>
<tr>
<td>Maximum width of curb cut</td>
<td></td>
<td>Driveway width + .5m</td>
</tr>
</tbody>
</table>

*unless designated as a fire route

7.5.1 LOCATION AND DESIGN

"Driveway locations and designs may require special considerations and will be reviewed on an individual basis."

The number of driveways per lot shall be limited to

(a) not more than one driveway for the first 15m of frontage.
(b) not more than two driveways for frontages of more than 15m but not exceeding 30m of frontage.
(c) not more than one additional driveway for each additional full 30m of frontage beyond the first 30m.
(d) not more than two driveways for the first 150m of frontage in large generators such as shopping centres.

NOTE:
- The minimum distance between driveways shall be 7.5m measured along the
- A corner lot for the purpose of this section shall be deemed to have frontage on both streets.

Where the property abuts a road under the jurisdiction of the Regional Municipality of Niagara, Regional policies shall supersede the City policies and the Regional Municipality shall be consulted prior to the approval of any Site Plan.
### 7.5.2 PARKING REQUIREMENTS TABLES

**SURFACE PARKING AREA**

**PARKING SPACES AT LEAST 3.00 M IN WIDTH**

**OPEN BUILDING OR STRUCTURE INCLUSIVE OF ANY BUILDING OR STRUCTURE PARKING**

<table>
<thead>
<tr>
<th>Angle of Parking Space with Manoeuvring Aisle</th>
<th>Minimum Perpendicular Length of Parking Space</th>
<th>Minimum Perpendicular Width of Manoeuvring Aisle</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 60 degrees, up to 90 degrees</td>
<td>6.0 metres (19.69 ft.)</td>
<td>5.9 metres (19.36 ft.) Two Movement</td>
</tr>
<tr>
<td>More than 45 degrees, up to 60 degrees.</td>
<td>6.4 metres (21.00 ft.)</td>
<td>4.6 metres (15.09 ft.) One Way Movement</td>
</tr>
<tr>
<td>More than 30 degrees, up to 45 degrees.</td>
<td>6.0 metres (19.69 ft.)</td>
<td>3.6 metres (11.81 ft.) One Way Movement</td>
</tr>
<tr>
<td>0 degrees (parallel), up to 30 degrees.</td>
<td>6.7 metres (21.98 ft.)</td>
<td>3.0 metres (9.84 ft.) One Way Movement</td>
</tr>
</tbody>
</table>

**COVERED BUILDING OR STRUCTURE PARKING AREA**

**PARKING SPACES AT LEAST 3.00 M IN WIDTH**

<table>
<thead>
<tr>
<th>Angle of Parking Space with Manoeuvring Aisle</th>
<th>Minimum Perpendicular Length of Parking Space</th>
<th>Minimum Perpendicular Width of Manoeuvring Aisle</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 60 degrees, up to 90 degrees</td>
<td>6.0 metres (19.69 ft.)</td>
<td>5.9 metres (19.36 ft.) Two Way Movement</td>
</tr>
<tr>
<td>More than 45 degrees, up to 60 degrees.</td>
<td>6.4 metres (21.00 ft.)</td>
<td>4.4 metres (14.44 ft.) One Way Movement</td>
</tr>
<tr>
<td>More than 30 degrees, up to 45 degrees.</td>
<td>6.0 metres (19.69 ft.)</td>
<td>3.6 metres (11.81 ft.) One Way Movement</td>
</tr>
<tr>
<td>0 degrees (parallel), up to 30 degrees.</td>
<td>6.7 metres (21.98 ft.)</td>
<td>3.0 metres (9.84 ft.) One Way Movement</td>
</tr>
</tbody>
</table>

**TABLES FROM CITY'S ZONING BY-LAW**
SURFACE PARKING AREAS
FOR SPACES LESS THAN 3.00 M. WIDTH BUT NOT LESS THAN 2.75 M
OPEN BUILDING OR STRUCTURE INCLUSIVE OF ANY OPEN BUILDING OR STRUCTURE PARKING

<table>
<thead>
<tr>
<th>Angle of Parking Space with Manoeuvring Aisle</th>
<th>Minimum Perpendicular Length of Parking Space</th>
<th>Minimum Perpendicular Width of Manoeuvring Aisle</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 60 degrees, up to 90 degrees</td>
<td>6.0 metres (19.69 ft.)</td>
<td>6.9 metres (22.64 ft.) Two Movement</td>
</tr>
<tr>
<td>More than 45 degrees, up to 60 degrees.</td>
<td>6.4 metres (21.00 ft.)</td>
<td>5.2 metres (17.06 ft.) One Way Movement</td>
</tr>
<tr>
<td>More than 30 degrees, up to 45 degrees.</td>
<td>6.0 metres (19.69 ft.)</td>
<td>3.7 metres (12.14 ft.) One Way Movement</td>
</tr>
<tr>
<td>0 degrees (parallel), up to 30 degrees.</td>
<td>6.7 metres (21.98 ft.)</td>
<td>3.0 metres (9.84 ft.) One Way Movement</td>
</tr>
</tbody>
</table>

COVERED BUILDING OR STRUCTURE PARKING AREA
PARKING SPACES LESS THAN 3.00 M IN WIDTH BUT NOT LESS THAN 2.75 M

<table>
<thead>
<tr>
<th>Angle of Parking Space with Manoeuvring Aisle</th>
<th>Minimum Perpendicular Length of Parking Space</th>
<th>Minimum Perpendicular Width of Manoeuvring Aisle</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 60 degrees, up to 90 degrees</td>
<td>6.0 metres (19.69 ft.)</td>
<td>6.3 metres (20.67 ft.) Two Movement</td>
</tr>
<tr>
<td>More than 45 degrees, up to 60 degrees.</td>
<td>6.4 metres (21.00 ft.)</td>
<td>5.2 metres (17.06 ft.) One Way Movement</td>
</tr>
<tr>
<td>More than 30 degrees, up to 45 degrees.</td>
<td>6.0 metres (19.69 ft.)</td>
<td>3.7 metres (12.14 ft.) One Way Movement</td>
</tr>
<tr>
<td>0 degrees (parallel), up to 30 degrees.</td>
<td>6.7 metres (21.98 ft.)</td>
<td>3.0 metres (9.84 ft.) One Way Movement</td>
</tr>
</tbody>
</table>

TABLES FROM CITY’S ZONING BY-LAW
7.6 SIDEWALKS AND CURBS

(a) All sidewalks and curbs shall conform to the Ontario Provincial Standard Specifications and Drawings 303.01, 303.04, 500.11, 303.03, 303.05 and City of Niagara Falls drawing 303.1.

(b) All required curb cuts and curb fills will be performed by the City of Niagara Falls at the owner's cost.

(c) Shall be a minimum width of one metre where walkways are used by more than one residential unit.

(d) Shall be a minimum width of 1.5 metres for commercial, industrial and residential units of 25 units.

(e) Shall be an additional width of .5m for those sidewalks adjacent to driveways and parking areas.

(f) Shall be an additional width of 1m for those sidewalks located along that face of a commercial building who's entrances are located onto said sidewalk.

(g) Shall be ramped for wheelchair access at no more than 1:12 grade.

(h) It shall be responsibility of the site designer to provide safe pedestrian routes between commercial and residential developments and to the municipal road allowances.

7.7 LOT GRADING

Existing elevations both on the site and on adjacent lands a minimum distance of 3 m from the property line around the perimeter of the site shall be shown. This can vary according to topography.

All elevations must be referred to City of Niagara Falls Geodetic Benchmark which are available upon request at the Municipal Works Department.

Proposed elevations shall be shown at the lot corners, top of catchbasins, building aprons and ground floor, along the top of curb and centre line of all roads and parking areas and at strategic points along property lines, swales, etc. such that the proposed drainage pattern is clearly indicated by arrows showing direction of flow.

All swales must be shown in detail and must include the length of the swale together with the percentage grade along the swale. The minimum grade along any swale shall be 1.0%.

A legend shall be included in every lot grading plan clearly indicating existing elevations, proposed elevations, etc.

All surface drainage including downspout discharge, shall be directed away from the building(s), including adjacent existing or future buildings.

The maximum slope between the building and the side property line shall be 3 to 1. Otherwise, appropriate steps or retaining structures shall be required.

The minimum grade on driveways shall be 1.5%. The desirable maximum grade on driveways shall be 8% with an absolute maximum grade of 10%. 
7.7.1. RETAINING WALLS

All retaining wall subject to an external surcharge (i.e. parking facility) shall be designed by a structural engineer.

Note that under section 2.1.2 of the Ontario Building Code retaining walls exceeding 1.0m in exposed height adjacent to
(i) Public property
(ii) Access to a building, or
(iii) Private property to which the public is admitted shall be designed in accordance with Part 4 of the Ontario Building Code.

7.8 PROCEDURES FOR THE DEDICATION OF ROAD WIDENINGS AND DAYLIGHTING TRIANGLES

Road Widening and Daylighting Triangles shall be dedicated to the Municipality by the owner free of charge and free of encumbrances.

Dedications shall take place prior to the issuance of Building Permits or prior to the execution of any agreement by the Municipality, whichever is the earlier.

The owner shall arrange for a Reference Plan to be prepared by the Ontario Land Surveyor, setting out the blocks to be dedicated.

The entire cost of the preparation of a Reference Plan shall be borne by the owner.

The owner shall instruct the selected Ontario Land Surveyor to submit the Reference Plan to the City’s Municipal Works Department for approval prior to registration.

The owner shall provide the City with a deed in a form acceptable to the Land Registrar for the road widening and/or daylighting triangle blocks.
7.9 ENGINEERING DETAILS

Sewer Service Connections
  for flexible pipe
  for rigid pipe

Manhole Benching Details

Manhole Drop Structure

Watermain Trench Cross-Section
  Rigid and Flexible Pipe

Sewer Trench Cross-Section
  Rigid and Flexible Pipe

Concrete Barrier Curb

Concrete Sidewalk

Joints at sidewalk openings

Sidewalk Ramps

Concrete Sidewalk

Driveway Entrance with Boulevard

Urban Private Entrance combined
  Concrete Curbs & Sidewalk

Hydrant Installation

Protectus III Meter Pit Specifications

Fire Service Turbine Meter Pit Specifications

Try/Flow Compound Meter Pit Specifications

Meter Pit Specifications for 40 mm (1 1/2") and
  50 mm (2") Meters

Silt Control Fence Detail
NOTES:

A For sewers smaller than 450 mm dia., connections must be made using approved factory made tees; for all other sizes, either approved factory made tees or approved saddles may be used.

B Saddles must be installed on the main pipe before that pipe is laid.

C Approved cut-in tool must be used for field made tees.

D Service connection must be securely plugged at property line with an expanding type plug or approved equal.

E Plug at property line shall be adequately braced to withstand testing pressures.

F Double connections shall be made using a factory made wye.

G All dimensions are in millimetres unless otherwise shown.
**NOTES:**

A For sewers smaller than 450 mm dia, connections must be made using approved factory made tees; for all other sizes, either factory made tees or approved saddles may be used.

B Saddles must be installed on the main pipe before that pipe is laid.

C Approved cut-in tool must be used for field made tees.

D Service connection must be securely plugged at property line with an expanding type plug or approved equal.

E Plug at property line shall be adequately braced to withstand testing pressures.

F Double connections shall be made using a factory made wye.

G For riser detail concrete bedding to have minimum width of 600 mm.

H All dimensions are in millimetres unless otherwise shown.

**ONTARIO PROVINCIAL STANDARD DRAWING**

**SEWER SERVICE CONNECTIONS**

**FOR RIGID PIPE**

**OPSD - 1006.01**
NOTES:
A Concrete to be 20MPa compressive strength
B Benching to be given wood float finish, channel to be given steel trowel finish.
C All pipe must extend 300mm straight out from manhole wall before curvature begins.
D All dimensions are in millimetres unless otherwise shown.

<table>
<thead>
<tr>
<th>nom. diameter mm</th>
<th>no.1-4 mm</th>
<th>no.5&amp;6 mm</th>
<th>no.8 mm</th>
<th>inlet hole mm</th>
<th>outlet hole mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>700</td>
<td>860</td>
<td>780</td>
<td>700</td>
<td>860</td>
</tr>
<tr>
<td>1500</td>
<td>860</td>
<td>1170</td>
<td>960</td>
<td>860</td>
<td>1170</td>
</tr>
<tr>
<td>1800</td>
<td>1170</td>
<td>1420</td>
<td>1220</td>
<td>1170</td>
<td>1420</td>
</tr>
<tr>
<td>2400</td>
<td>1420</td>
<td>1930</td>
<td>1760</td>
<td>1420</td>
<td>1930</td>
</tr>
</tbody>
</table>
A Drop structure to be completely encased in 150 mm of 20 MPa concrete and secured to the manhole with 450 mm long, 13 mm dia threaded rods and drilled expansion anchors down both sides of the drop pipe at 300 mm c/c.

B All dimensions are in millimetres unless otherwise shown.
FINISHED GRADE

TOP OF SUBGRADE

BACKFILL MATERIAL (UNLESS OTHERWISE NOTED)
GRANULAR 'A' TO 100% S.P.D. (ROADWAYS AND DRIVEWAYS)
NATIVE MATERIAL TO 95% S.P.D. (GRASS AREAS)

COVER MATERIAL GRANULAR 'A'
TO 100% S.P.D.

PROPOSED WATERMAIN
P.V.C. DR-18 CL 150 OR APPROVED EQUAL

COVER MATERIAL GRANULAR 'A'

BEDDING MATERIAL
GRANULAR 'A'

150mm MIN.
SEE NOTE 7

O/D

LEGEND

1. WATERMAIN CONSTRUCTION SHALL CONFORM TO OPSS 701
2. WATERMAIN BEDDING – CLASS "B" Lf = 1.9
3. WATER SERVICES SHALL CONFORM TO OPSD 1104.01
4. THE PIPE BED IS TO BE CAREFULLY SHAPED TO RECEIVE THE BOTTOM OF THE PIPE
5. THIS STANDARD IS TO BE APPLIED IN STABLE CONDITIONS OR AFTER TRENCH HAS BEEN BROUGHT TO STABLE CONDITION
6. HAUNCHES MUST BE BACKFILLED AND COMPACTED PRIOR TO PLACING COVER MATERIAL
7. BEDDING DEPTH IN ROCK TO BE 300mm MINIMUM
8. IN ROCK EXCAVATION PROVIDE A 50mm LAYER OF STYROFOAM HI-60 BETWEEN TRENCH WALLS AND EXTENDING FROM BOTTOM OF TRENCH TO TOP OF COVER MATERIAL
9. PROTECTION AGAINST HEAVY CONSTRUCTION EQUIPMENT ACCORDING TO OPSD 808.01
10. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED
SEEN ROAD CROSS-SECTION FOR DETAIL

FINISHED GRADE

TOP OF SUBGRADE

BACKFILL MATERIAL (UNLESS OTHERWISE NOTED)
GRANULAR 'A' TO 100% S.P.D. (ROADWAYS AND DRIVEWAYS)
NATIVE MATERIAL TO 95% S.P.D. (GRASS AREAS)

COVER MATERIAL
GRANULAR 'A' TO 100% S.P.D.

PROPOSED SEWERMAIN

CLEARANCE (SEE TABLE)

BEDDING MATERIAL
GRANULAR 'A'

300mm MIN.

MIN. 150mm
0.15D
SEE NOTE 7

LEGEND

1. SEWER CONSTRUCTION SHALL CONFORM TO OPSS 410

2. SEWER BEDDING - CLASS "B" Lf=1.9

3. SEWER LATERALS SHALL CONFORM TO OPSD 1006.01 & OPSD 1006.02

4. THE PIPE BED IS TO BE CAREFULLY SHAPED TO RECEIVE THE BOTTOM OF THE PIPE

5. THIS STANDARD IS TO BE APPLIED IN STABLE CONDITIONS OR AFTER TRENCH HAS BEEN BROUGHT TO STABLE CONDITION

6. HAUNCHES MUST BE BACKFILLED AND COMPACTED PRIOR TO PLACING COVER MATERIAL

7. BEDDING DEPTH IN ROCK TO BE 300mm MINIMUM

8. IN ROCK EXCAVATION PROVIDE A 50mm LAYER OF STYROFOAM HI-60 BETWEEN TRENCH WALLS AND EXTENDING FROM BOTTOM OF TRENCH TO TOP OF COVER MATERIAL

9. PROTECT AGAINST HEAVY CONSTRUCTION EQUIPMENT ACCORDING TO OPSD 808.01

10. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED

CLEARANCE TABLE*

<table>
<thead>
<tr>
<th>RIGID PIPE INSIDE DIAMETER (mm)</th>
<th>MINIMUM CLEARANCE (mm)</th>
<th>MAXIMUM CLEARANCE (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 or less</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>OVER 900</td>
<td>500</td>
<td>600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FLEXIBLE PIPE INSIDE DIAMETER (mm)</th>
<th>MINIMUM CLEARANCE (mm)</th>
<th>MAXIMUM CLEARANCE (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 or less</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>OVER 600</td>
<td>1.57 x 0/2</td>
<td>600</td>
</tr>
</tbody>
</table>

*CLEARANCE TO EXTEND FROM BOTTOM OF TRENCH TO TOP OF COVER MATERIAL

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

SEWER TRENCH CROSS-SECTION
RIGID AND FLEXIBLE PIPE
NOTES:
1. Where sidewalk is continuously adjacent, reduce the dropped curb at entrances to 75 mm.
2. For slipforming procedure, a 5% batter is acceptable.
A. Treatment at entrances shall conform with OPSD-351.01.
B. Outlet treatment shall conform with OPSD-610 Series.
C. The length of transition from one curb type to another shall be 3.0 m, except in conjunction with guide rail, it shall conform to OPSD-900 Series.
D. All dimensions are in millimetres unless otherwise shown.
COMMERCIAL DRIVES TO BE 200mm IN DEPTH WITH 150X150 MW 11.1 X MW 11.1 WIRE MESH PLACED.

NOTES:
1. SIDEWALK SHALL CONFORM TO O.P.S.S. 351 AND O.P.S.D. 303.03
2. URBAN PRIVATE ENTRANCES WHERE THE SIDEWALK IS ADJACENT TO THE CURB & GUTTER SHALL CONFORM TO O.P.S.D. 303.01
3. URBAN PRIVATE DRIVEWAY ENTRANCES WITH BOULEVARDS SHALL CONFORM TO O.P.S.D. 303.02
4. SIDEWALK RAMPS (WHEELCHAIR RAMPS) SHALL CONFORM TO O.P.S.D. 303.04
5. JOINTS AT SIDEWALK OPENINGS SHALL CONFORM TO O.P.S.D. 303.05
6. MINIMUM STRENGTH 28 DAYS 25 MPa
7. AIR CONTENT TO BE NOT LESS THAN 5% NOR MORE THAN 7%
8. DIMENSIONS IN mm EXCEPT AS NOTED
TYPE 'A'
ISOLATION OF CATCHBASIN CHAMBERS
MANHOLE AND CHAMBERS
WITHIN THE SIDEWALK

TYPE 'B'
POLE HYDRANT AND SERVICES
WITH CIRCULAR EXPANSION MATERIAL

TYPE 'C'
ISOLATION OF POLE HYDRANT AND SERVICES

NOTES:
A For dummy and expansion joint refer to OPSD-303.03
B All dimensions are in millimetres or metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

JOINTS AT
SIDEWALK OPENINGS

OPSD - 303.05
**NOTES:**

1. Maximum slope of ramp should be 12:1.

A. The texture of the ramp surface shall be rougher than the texture used on the surrounding sidewalk.

B. The standard to be read in conjunction with OPSD-303.03.

C. All dimensions are in millimetres or metres unless otherwise shown.
NOTES:
1. Distance indicated shall be 1.5 m for residential driveways and 3.0 m for residential parking lots, schools, apartments, etc.
2. Where boulevard width is less than 1.0 m, steeper slopes are permissible.
A. Expansion joints are required in sidewalk at intervals of 6.0 m and
   a. Between sidewalk and abutting curb.
   b. At both ends of dropped sidewalk section and at mid span when length is greater than 6.0 m; these joints are to be carried through abutting curb.
   c. To isolate obstructions from sidewalk; eg. hydrants, light standards, buildings etc.
B. Reinforcement, if required, as per specification.
C. Dummy joints shall have standard spacing of 1.5 m, in no case less than 1.0 m or more than 2.0 m.
D. All concrete edges of bays to be finished with edgers, 5 mm radius.
E. Sidewalk crossfall to be maintained at minimum commensurate with departure or breakover requirements.
F. All dimensions are in millimetres or metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE SIDEWALK

ONTARIO PROVINCIAL STANDARD DRAWING

Date 1983 12 01 Rev

---

OPSD - 303.03
Where boulevard width is less than 1.0m, steeper slopes are permissible.

A. All dimensions are in metres unless otherwise shown.
THICKNESS TABLE

<table>
<thead>
<tr>
<th>LOCATION OR USE</th>
<th>THICKNESS (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL DRIVEWAY</td>
<td>130</td>
</tr>
<tr>
<td>ACCESS LOTS FRONTING ON STREET</td>
<td></td>
</tr>
<tr>
<td>ACROSS COMMERCIAL AND INDUSTRIAL</td>
<td>200</td>
</tr>
<tr>
<td>DRIVEWAY (Note B)</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
A. Concrete to be: 25 MPa compressive strength at 28 days.
B. Reinforcement, if required, as per specification.
C. This standard to be read in conjunction with OPSD-600.03.
D. All dimensions are in millimetres or metres unless otherwise shown.
NOTES:
A All concrete blocking to be poured against undisturbed ground.
B Polyethylene bond breaker to be used between concrete and fittings.
C Bolts for buried flange to flange connections are to be stainless steel.
D All dimensions are in millimetres unless otherwise shown.
NOTES

1. BY-PASS DIAMETER MAY BE OF ANY SUITABLE SIZE, AS IT IS USED TO GIVE SERVICE DURING REPAIRS OR TESTING.

2. PIT FLOOR CAN BE OF CONCRETE OR STONE. PIT DRAINAGE TO BE PROVIDED WHEREVER POSSIBLE.

3. OPENING COVER SHOULD BE HEAVY ENOUGH TO DISCOURAGE VANDALISM, BUT LIGHT ENOUGH TO BE REMOVED OR REPLACED WITHOUT MUCH DIFFICULTY.

4. MINIMUM WALL THICKNESS 150mm (6")

5. IF BACKFLOW PREVENTER REQUIRED CHAMBER SIZE MAY VARY

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>100</td>
<td>430</td>
<td>558</td>
<td>613</td>
<td>292</td>
<td>150</td>
<td>457</td>
<td>230</td>
<td>2060</td>
<td>2444</td>
<td>1665</td>
</tr>
<tr>
<td>150</td>
<td>1143</td>
<td>775</td>
<td>727</td>
<td>306</td>
<td>150</td>
<td>457</td>
<td>230</td>
<td>2130</td>
<td>3050</td>
<td>1665</td>
</tr>
<tr>
<td>200</td>
<td>1346</td>
<td>851</td>
<td>780</td>
<td>432</td>
<td>150</td>
<td>457</td>
<td>230</td>
<td>2225</td>
<td>3093</td>
<td>2444</td>
</tr>
<tr>
<td>E</td>
<td>83</td>
<td>33</td>
<td>22</td>
<td>43</td>
<td>6</td>
<td>18</td>
<td>9</td>
<td>24</td>
<td>96</td>
<td>64</td>
</tr>
</tbody>
</table>

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

PROTECTUS III METER PIT SPECIFICATIONS

DIRECTOR OF MUNICIPAL WORKS

DATE

SCALE
N.T.S.

REV.

REV.

DWG. NO.
NF-1107.4

Page 62
NOTES

1. Bypass diameter may be of any suitable size, as it is used to give service during repairs or testing.

2. Pit floor can be of concrete or stone. Pit drainage to be provided wherever possible.

3. Opening cover should be heavy enough to discourage vandalism, but light enough to be removed or replaced without much difficulty.

4. Minimum wall thickness 150mm (6")

5. If backflow preventer required chamber size may vary.

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
<td>mm/INS</td>
</tr>
<tr>
<td>100</td>
<td>33 1/2</td>
<td>362</td>
<td>4,91</td>
<td>164</td>
<td>7,1/2</td>
<td>533</td>
<td>21</td>
<td>400</td>
<td>12</td>
<td>4</td>
<td>2185</td>
<td>1220</td>
</tr>
<tr>
<td>150</td>
<td>45</td>
<td>408</td>
<td>8</td>
<td>457</td>
<td>583</td>
<td>100</td>
<td>4</td>
<td>305</td>
<td>12</td>
<td>4</td>
<td>2185</td>
<td>2340</td>
</tr>
<tr>
<td>200</td>
<td>55</td>
<td>317</td>
<td>22</td>
<td>254</td>
<td>100</td>
<td>4</td>
<td>305</td>
<td>12</td>
<td>4</td>
<td>2185</td>
<td>3284</td>
<td></td>
</tr>
</tbody>
</table>

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

APPROVED

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

DIRECTOR OF MUNICIPAL WORKS

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

DATE

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

REVISED

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

DWG. NO.

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

REV.

CITY OF NIAGARA FALLS
MUNICIPAL WORKS

FIRE SERVICE TURBINE METER
PIT SPECIFICATIONS

Page 63
### NOTES

1. Bypass diameter may be of any suitable size, as it is used to give service during repairs or testing.
2. Pit floor can be of concrete or stone. Pit drainage to be provided wherever possible.
3. Opening cover should be heavy enough to discourage vandalism, but light enough to be removed or replaced without much difficulty.
4. Minimum wall thickness 150mm (6")
5. If backflow preventer required chamber size may vary.

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm/INS</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>75</td>
<td>3</td>
<td>11</td>
<td>23.5</td>
<td>1.25</td>
<td>88</td>
<td>3.75</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>305</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>20</td>
<td>32</td>
<td>1.75</td>
<td>94</td>
<td>4.5</td>
<td>190</td>
<td>150</td>
<td>150</td>
<td>305</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>34</td>
<td>44</td>
<td>2</td>
<td>140</td>
<td>6</td>
<td>230</td>
<td>150</td>
<td>150</td>
<td>305</td>
<td>150</td>
<td>6</td>
</tr>
</tbody>
</table>

### CITY OF NIAGARA FALLS
MUNICIPAL WORKS

TRU/FLOW COMPOUND METER
PIT SPECIFICATIONS

APPROVED
DIRECTOR OF MUNICIPAL WORKS
DATE

SCALE N.T.S.
REV.

CITY OF NIAGARA FALLS MUNICIPAL WORKS
TRU/FLOW COMPOUND METER PIT SPECIFICATIONS

APPROVED
DIRECTOR OF MUNICIPAL WORKS
DATE

SCALE N.T.S.
REV.

CITY OF NIAGARA FALLS MUNICIPAL WORKS
TRU/FLOW COMPOUND METER PIT SPECIFICATIONS

APPROVED
DIRECTOR OF MUNICIPAL WORKS
DATE

SCALE N.T.S.
REV.

CITY OF NIAGARA FALLS MUNICIPAL WORKS
TRU/FLOW COMPOUND METER PIT SPECIFICATIONS

APPROVED
DIRECTOR OF MUNICIPAL WORKS
DATE

SCALE N.T.S.
REV.
FOR 40mm (1 1/2") AND 50mm (2") METERS

METER PIT SPECIFICATIONS

CITY OF NIAGARA FALLS

MUNICIPAL WORKS

NOTES

1. Wall and Floor Thickness - Minimum of 100mm (4")
2. Top Height and Material Covered by Pit Location
3. Pit Height Shown is Inside Dimension
4. BT-1105 Diameter To Be of Suitable Size
5. Pit Opening To Be 800mm (2') Diameter or Square
6. El Bow into Preventer Required Chamber Size May Vary

A 90mm (3 1/2") METER = 450mm (17")
A 2 40mm (1 1/2") METER = 330mm (13")
50 x 50 wood pickets @ 1.2m O/C.

Class 1
Geotextile filter fabric, nailed or stapled to stakes, and to extend min. 150mm into the ground.

Native material

Ground line

Creek/ditch

GENERAL NOTES:
1. Dimensions in mm unless otherwise shown.

City of Niagara Falls
Municipal Works

Silt Control Fence Detail