THE CORPORATION OF THE TOWNSHIP OF BONFIELD

BY-LAW NO. 2018-32

BEING A BY-LAW TO ADOPT ENGINEERING SUBDIVISION STANDARDS

Whereas the Municipal Act 2001, S.O. 2001 C.25, Section 224, as amended, states that it is the role of Council to ensure that administrative practices and procedures are in place to implement the decisions of Council;

And Whereas the Council of the Corporation of the Township of Bonfield deems it desirable to adopt Engineering Subdivision Standards;

Now Therefore the Council of the Township of Bonfield hereby enacts as follows:

1. That the Engineering Subdivision Standards attached hereto as Schedule "A' form part of this By-law and shall be the Engineering Subdivision Standards for the Township of Bonfield;

2. That the Township Engineer is authorized to revise the Engineering Subdivision Standards as deemed appropriate. Such revisions shall be documented accordingly, and the revised document shall be publicly available;

3. This by-law shall take effect on the final passing thereof

READ A FIRST AND SECOND TIME THIS 14th DAY OF AUGUST 2018.

READ A THIRD TIME AND FINALLY PASSED THIS 11th DAY OF SEPTEMBER 2018.

_____
MAYOR

_____
CLERK

ENGINEERING STANDARDS FOR SUBDIVISIONS

"SCHEDULE A"
BY-LAW NO. 2018-32

The following outlines some requirements for engineering submissions for approval of residential construction within the jurisdiction of the Township of Bonfield. The Township reserves the right to alter any of these requirements as specified with each Subdivision Development agreement.

Construction standards are to follow OPSS MUNI 100. All drawings and documents submitted to the Township are to be in a standard metric scale.

Prior to commencement of detailed design, it is advisable that the developer and/or his consultant meet with Township Engineer or his/her representative to clarify the Township requirements for engineering submissions.

1.1 GENERAL REQUIREMENTS

All developments shall include the following, unless otherwise stated;

a) Roads, including hot mix, hot laid asphalt pavement,

b) Shoulder,

c) Ditches and drainage easements.

d) Cistern, water storage for fire demand,

e) Septic and well envelope,

f) Street names and regulatory signs,

g) Aboveground utilities or equivalent (Hydro, telephone, gas, cable TV., etc.)

h) Street lighting,

i) Grading to ensure adequate surface drainage,

j) Landscaping, Sedimentation and Erosion Control,

1.2 FUNCTIONAL REPORT

The need for a Functional Report will be established by the Township Engineer or his/her representative during the review of the developmental application. The Functional Report (if required) shall include, but not necessarily be limited to, the following information:

a) Roadway Network
- impact of the development on any roads within or abutting the Development,
- traffic study (if required by MTO).

b) Storm Drainage – Open Ditch
- tributary for drainage areas and proposed flows for sizing culverts
- designation for major and minor drainage systems – directions of flow and outlet,
- storm water management facilities if required
- ditch sizing, swale, easement location and outlets

c) Storm Water Management Report (if required)

d) Septic Envelope
- main location for septic bed envelopes to be submitted to NBMCA

e) Well Envelope
- main location for well envelopes that may require hydrology report

f) Fire Flow Volume Demand Calculations
- for sizing of cistern tank

g) Noise Study – for developments located near noise sensitive area (if required)
- special building requirements,
- noise barrier requirements.

1.3 ENGAGEMENT OF PROFESSIONAL ENGINEER

The Developmental Applicant shall retain for any and all development projects, a Professional Engineer licensed to practice in the Province of Ontario, who is experienced in the design and execution of land development projects and is acceptable to the Township.

Inspection during construction may be carried out by the Township, a consultant hired by the Township or the developer, or shared by the Township and the cost of such undertaking shall be included in the Township Engineering Fees.

1.4 PROFESSIONAL ENGINEERING SERVICES

The professional Engineer retained by the applicant will prepare and execute the following activities in conjunction with the engineering requirement of the Township.

a) Preliminary investigation and report,
b) Pre-engineering survey,
c) Soils investigation,
d Final design and report,
e) Plan, specifications, tender documents and contracts,
f) Cost estimate,
g) Applications,
h) Calling of tenders,
i) Analysis of bids and recommendations to the applicant and Township staff,
j) Setting out the work,
k) General administration of construction,
l) Full time site supervision of construction,
m) As-constructed drawings,
n) Coordination of all utilities (gas, telephone, hydro, cable T.V., etc.)

1.5 ENGINEERING INSPECTION FEES

The developer shall pay, prior to execution of the developmental agreement with the Township, an amount of money equal to a percentage of the estimated construction costs of all ditches, culverts, roads and all other construction works pertinent to the development under the jurisdiction of the Township. The minimum amount of money to be paid for inspection shall be determined by the following scale of fees:

i) 4.5 percent of the total cost of services up to $100,000.00 with a maximum payment of $4,500.00; plus

ii) 4 percent of the total cost of services in excess of $100,000.00 up to $400,000.00 with a minimum of $4,500.00; plus

iii) 3.5 percent of the total costs of services in excess of $400,000.00 and shall be payable in cash or certified cheque to the Corporation of the Township of Bonfield.

1.6 ENGINEERING DOCUMENTS FOR DEVELOPMENTAL AGREEMENT

Prior to the preparation and execution of a subdivision development agreement, the Township requires a complete submission of Engineering Drawings and specifications to be provided by the developers consulting Engineer to the Township's Engineering Department for their technical review and comment.

A complete submission constitutes the following items:

a) A letter of transmittal,
b) Engineering design brief,
c) Engineering drawings,
d) Contract documents,
e) Construction cost estimate and proposed construction schedule.

1.6.1 Letter of Transmittal

The letter can be a standardized form or a formal letter indicating the submission date and number, contents of the submission package, and the name of the appropriate contract personnel.

1.6.2 Engineering Design Brief

The engineering design brief is a technical report summarizing the intents of the project, and outlines the design assumptions, calculations, supporting documentation and references ro previous studies, for each component of the development.

2.0 ENGINEERING DRAWINGS

a) Drawing size shall be A1 (600mm x 900mm)

b) Plan and profile - horizontal metric scale shall be 1:500
- vertical metric scale shall be 1:50

c) Metric scale for general plans shall be a minimum of 1:1000,

d) Drawings shall be made available in Pdf and AutoCAD format,

e) All drawings shall be neat, legible and completed in ink,

f) All culverts length and diameter, direction of flow, pipe class and bedding, and service connections shall be shown on all drawings,

g) Where plans require more than one drawing, match lines shall be provided, showing both reference drawing numbers, preceding and following, plus station.

h) A complete set to drawings shall include:
- i) Title sheet including index
- ii) General Plan of Services
- iii) General Lot Grading Plan
- iv) Septic and Well Envelope Plan
- v) Storm Drainage Area Plan
- vi) Plan and Profile Drawings
- vii) Erosions and Sedimentation Control Plan
- viii) Composite Utility Plan including Street Lighting
- ix) Construction Details (where required)

i) Two copies including a digital file of the following documents shall be submitted to the Township.

a) Proposed final plan for registration (M-Plan),
b) Reference plan for easements being conveyed to the Township,
c) Complete set of Engineering Drawings,
d) Storm Water Management Report c/w culvert sizing table,
e) A soils consultant report if deemed necessary by the Township,
f) Calculations for pipe strength and bedding requirements,

2.1 PROCEDURE FOR STORM WATER MANAGEMENT DESIGN CRITERIA)

The Design criteria (i.e. quality and quantity control) for storm water management works such as this is usually specified by the authority (i.e. Township, Conservation Authority, MNRF, DFO, and if applicable the MOECC) that is responsible for the drainage outlet (i.e. river, creek, drain, roadside ditch, etc.), that the Proponent\s proposed storm drainage work will discharge into.

The Developer shall determine who is responsible, owns and operate all drainage outlets for the development and seek approval from the applicable Authority as such.

The Authority accepting the drainage outlet generated by the development will dictate the quality, quantity control. The Developer shall provide the Township with the requirement from such authority meeting both the quality and quantity control of runoff from the proposed Site.

If required, approvals will be obtained via direct submission with the governing authority.

1. Developer or his consultant submits four (4) copies of completed application forms for storm drainage. Submission must include:

a) Letter or form of transmittal
b) Engineer's report
c) Supporting documentation – servicing study, charts, graphs, etc.
d) Plan and profile drawings
e) Contract specifications – detail drawings and standards
f) General and Drainage Area Plans
g) Design sheet and computations
h) Certificate of Approval
i) Environmental Assessment Exemption Affidavit (when appropriate)

2. Township comments on necessary policy checks

3. Developer submits revised drawings, application and data to the Authorities with a recommendation.

4. Authorities reviews submission and if necessary, issues Certificate of Approval if requirements met.

2.2 CONTRACT DOCUMENTS

Upon final Engineering submission for approval of the Engineering Drawings, one (1) copy of the Contract Document for the project is required to be provided to the Township for their review.

Prior to commencement of construction of services, two copies of the Contract Documents, one with prices and one without, plus two (2) sets of contract drawings are required to be provided to the Township Engineer.

The Contract Documents shall include all addenda and the Form of Tender.

2.3 COST ESTIMATE AND PROPOSED CONSTRUCTION SCHEDULE

An itemized cost estimate for the construction of the works in a form acceptable to the Township is required along with a breakdown of any items designated to be cost-shared.

A proposal construction schedule for all construction activities is to be provided to the Township Engineering. During the progress of the work, any revision to the original schedule shall be forwarded to the Township.

2.4 PREPARATION OF DEVELOPMENT AGREEMENT

The draft of the developmental agreement will be reviewed by the Town Engineer, the Planning Department and forwarded to the Township Solicitor. The solicitor will then prepare the final agreement and obtain Council approval of execution of the agreement by the Township.

Prior to the preparation of the draft agreement, the Township must be in receipt of the following information:

a) The name of the person and/or company with whom the development agreement will be executed,
b) The name, address and telephone number of the Developer's lawyer,
c) A breakdown of the number of units proposed within the development,
d) A detailed cost estimate prepared by an engineer for services to be constructed for the development,
e) Two (2) copies of the engineering drawings,
f) Three (3) copies of the reference plans for any easement to be granted to the Township.

2.5 AS BUILT DRAWINGS AND LOCATION PLANS FOR SERVICES

a) As-Built Location Plans

Upon preliminary acceptance of services, the required location plans for as constructed measurements are to be completed and submitted to the Township Engineer showing all necessary details for underground service installations. One digital copy of each location plan is to be submitted to the Township.

As-built locations plans are required for the following:
i) Road elevations and cross sections details.
ii) Storm Drainage, ditches, culverts, swales.

"As-built" Drawings constitute the original Engineering Drawings which have been revised to show "As-built" conditions. The "As-built" drawings shall be submitted to the Township for their permanent records.

3.0 ROADS

3.1 GENERAL

Road classification is designated by the Township and shall be subject to the approval of the Township Engineer. Generally, residential roads are classified as arterial, collector or local. Arterial roads are intended to carry large volumes of traffic, moving at medium to high speeds. Arterial roads serve the major traffic flows between the principal traffic generators and connect with collectors and freeways. Designs of arterial roadways are to meet the requirements of the

controlling authority. Collector roads provide for both traffic service and land access. The primary traffic service function is to carry traffic between local streets and arterial roadways. The Township classifies collector roads as any roadway which, in the opinion of the Township.

a) will serve as access to 100 or more homes,
b) will serve as a traversing route for residents outside of the subdivision.

A local road's function is to provide for land access to those properties which directly front on it.

3.1.1 Geometric Design Standards

	Local Road	**Collector Road**
Minimum Pavement Crown	3.0%	3.0%
Minimum grade	0.5%	0.5%
Maximum grade	8.0%	8.0%
Maximum Grade for through Roads at Int.	3.5%	3.0%
Maximum Grade for Stop Roads at Inters.	2.5%	2.0%
Minimum Radius at intersection	9 m	13 m
Cul-de-Sac Edge of Asphalt min. radius	15 m	N.A.
R.O.W	20 m	20 m
Pavement Width	6.7 m	8 m
Minimum Centreline Radius	60 m	85 m
Design Speed	60 km/h	60 km/h
Posted Speed	40 km/h	50 km/h
Vertical Curve Minimum sight		
Stopping distance	85m	85m
K. for Sag	18	18
K. for Crest	15	15
Super elevation	None required	None required
Intersection Angle	70-110 degrees	80-100 Degrees

*Except at 90 degree corners for crescents and courts
** At discretion of Township Engineer

3.1.2 Clearing and Grubbing

The road allowance shall be cleared of all trees and shrubs except where they are to be included in final landscaping, and other obstructions for such widths as are required for the proper installation of all roads, services, and other works. Rough grading shall be done to bring the travelled portion of the road to the necessary grade and in conformity with the cross-section shown on the drawings.

The sub-grade for all roads shall be properly shaped and thoroughly compacted prior to any application of granular base course materials. In all cases, topsoil shall be stripped for the complete width of the right-of-way and stockpiled at locations approved by the Township Engineer.

3.1.3 Alignment

Horizontal and vertical alignment is to conform to the requirements as outlined in Chapter 'C' of the Geometric Design and the Ontario Provincial Standard Drawings. All curves must meet the geometric design standards.

Vertical curves are required for changes in grade greater than 2% for collector and 2.5% for locals. The minimum calculation for each grade within vertical curves is at intervals of 5 metres. "Culs-de-sac" are to have minimum grade of 0.5% around the longest curb, to ensure adequate surface drainage.

3.1.4 Road Pavement Design

The pavement design for arterial roads will be considered on an individual basis. The composition and construction thickness of the road pavement shall be designed bases upon the following factors:

a) Mechanical analysis of the subgrade soil,
b) Drainage,
c) Frost susceptibility,
d) The future volume and class of traffic expected to use the pavement.

Pavement shall be designed for a minimum ADT – 1000 vehicles and an anticipated life for 25 years, 2% trucks at 85% reliability. This represents an average Log ESALs of 5.41 for a SN Value of 82.

3.1.5 Road Allowance Cross-Section

The typical road allowance cross-section shall be as per Township Standard. Details shall be provided for any approved special provisions required due to unique physical conditions on the site or for existing or future design conditions such as retaining walls, slope protection, culverts, bridges or special crossfall conditions. Upon final inspections, one (1) year after construction, as-built of cross section will be measured and will be part of the part of final calculation towards the holdback release.

3.1.6 Intersections

At the intersection of two roads, any transition of the minor classification road shall not interfere with the normal crossfall of the major road. A 1% to 2% backfall grade shall be provided on all road profiles where local streets intercept with major roads. The backfill grade shall be from the crown of the major road to the E.C or first catchbasin on the local road.

3.2 DRIVEWAY ENTERANCES

The Developer shall be required to provide for the excavation, stoning and maintenance in good condition of each driveway from the travelled portion of the road to the lot line. The maximum grade permissible for an access driveway from the edge of shoulder to the lot line shall not exceed 7%. This maximum grade is not recommended, and shoulder be employed only in exceptional cases where physical conditions prohibit the use of lesser grades.

3.3 DAYLIGHTING

When subdivision streets intersect with Township roads, daylighting triangles are required. The size of the daylighting required is based on the classification of the intersecting roads and shall be in accordance with Standard Drawing. The Township Engineer may request additional daylighting above these requirements if he deems it necessary.

3.4 STREET NAME AND TRAFFIC SIGN REQUIREMENTS

The owner shall pay the cost of the supply and installation of permanent street name and traffic signs. Sufficient traffic control signs, as determined by the Engineer, shall be installed to ensure the safe and efficient flow of traffic.

3.5 UTILITY INSTALLATION

Location and installation details for utilities must be approved by the Township Engineer prior to the installation.

3.6 STREET LIGHTING

The Developer shall arrange for the design and installation of all lighting facilities and apparatus. The type, number of lights and their location together with the estimated cost of the total installation thereof, must be approved by the Township Engineer. The subdivider shall supply Township and/or the local electrical supply authority with easements wherever they are required.

Streetlights for Local roads are to be:

Along roadways;	model NXT24S 0 7 2ES 7 GY 3 UL S 2H
On cul-de-sacs and minor intersections;	model NXT24S 0 7 4AH 7 GY 3 UL S 2H

Streetlights for Connectors/Arterials roads are to be:

Along roadways;	model NXT36S 0 7 2ES 6 GY 3 UL S 2H
At intersections;	model NXT36S 0 7 3LB 6 GY 3 UL S 2H

Unusual or otherwise unique road types may require different optical patterns as directed by the Township Engineer.

3.7 ELECTRICAL DISTRIBUTION

Design and installation of the electrical distribution system for the proposed development is to meet the requirement of the local hydro authority. The Developer shall supply the Township and/or the local electrical supply authority with easements wherever they are required.

4.0 CISTERNS / DRY HYDRANT

4.1 Fire protection for residential development shall be reviewed by the Fire Chief and provision of a Cistern System may be required for first response.

4.2 Dry Hydrants
Fire protection may require the installation of a Dry Hydrant as required by the Fire Chief. Such installation shall be approved during the design process and shall be as per Standard Drawing. Freeze protection may be required on the pipe system.

5.0 SEPTIC SYSTEMS

5.1 Septic system location shall be identified in a septic envelope and approved by the NBMCA.

6.0 WELL SYSTEMS

6.1 Well location shall be identified in a well envelope in the engineering drawings. The Developer is responsible to provide a hydrology study supporting the capacity to service to proposed development.

7.0 LOT GRADING AND SURFACE DRAINAGE

7.1 GENERAL

New development lot grading must be prepared by a P. Eng. Or O.L.S.

At the time of final acceptance, the Consulting Engineer shall provide the Township with an as-built grading plan for the subdivision showing the finished grade of all key points as of a certain date. Minor variations will be allowed, provided the intents of the proposed approved plan was followed and there are no problems. There will be Zero (0) tolerance for road cross section crown below minimum standard.

This plan must carry the following certifying statement, signed and sealed by a Professional Engineer of the O.L.S. with the following note;

"*I have taken the field elevations shown (on such date), and hereby certify that the house grade and the grading of each lot or block is in conformity with the submission for a building permit. I further certify that as of this date that each lot or block within this subdivision drains satisfactorily and the grading of this subdivision has not adversely affected adjacent lands."*

It will be the responsibility of the developer to ensure that lot grading is completed to the satisfaction of the Township Engineer and that all swales are functional.

Lot grading shall be in accordance with the approved drawings. Any deviation from the overall grade plan will require approval of the Township Engineer.

7.2 OBJECTIVES

The lot grading plan will be reviewed and, therefore, should be designed with the following objectives in mind:

a) The establishment of independent and adequate drainage for each lot. This can be provided by either rear to front drainage or split drainage intercepted in a rear yard swale, French drains or catchbasins, etc.
b) The establishment of lot and house grades which are compatible with existing topography and surrounding development. The will achieve maximum utility and protection for the property and enhance its appearance.
c) The establishment of gradual gradation without terraces, steep slopes, or abrupt changes in grade. These are not only difficult to maintain, but also accentuate the artificially of the new topography.
d) Defined ditches should be avoided, wales may be incorporated.

7.3 DESIGN CRITERIA

a) The maximum allowable difference in elevations between abutting lots along the rear lot line is 0.03 metres. The slope should be located on the higher property.
b) Slopes shall not be steeper than a 3:1 slope unless approved by the Township Engineer, requiring engineered design.
c) The use of rear yard swales, embankments or retaining walls should be minimized.
d) Grass surfaces shall have a minimum slope of 1%.
e) Grading around houses and buildings shall direct the water away from the structure, called positive drainage.
f) Swale depth will vary depending on location and safety consideration (preferably not more than 500 mm)
g) Swale grades are recommended to be a least 1.0 percent. In clay-type soils swales may require French drains c/w perforated sub drain system.
h) The maximum runoff typically allowed in a swale between two houses is the drainage from those two yards.

i) The maximum swale length shall not exceed 90 metres. Such drainage shall not outlet along the surface between houses. Not more than 6 lots shall be serviced by one basin.
j) When rear lot drainage requires special systems to pick up surface drainage, the Township may require to maintain them, in which case, easements must be provided by the Developer. The width of such easement shall be 3 m.
k) The proposed elevations at the boundary of the subdivision shall match existing elevations and accept any surface drainage from the adjacent lands.
l) Provision is to be made to prevent ponding water on lands bordering the subdivision and within the subdivision during construction.
m) Below grade garage driveways are not allowed in the design.

7.4 PRE-GRADING

The subdivision shall be pre-graded prior to issuance of building permits and the Consulting Engineer shall clarify that such work has been done. Pre-grading requires that all lot corners, rear yard catch basins, swales and under drainage (French drains) of same and boulevards have been constructed in accordance with the "General Grading Plan".

8.0 STANDARD DRAWINGS

All references are to Township Drawing and OPSS MUNI 100

1. Figure 1 – Local Road typical cross section
2. Figure 2 – Collector Road typical cross section
3. Figure 3 – Frost taper
4. Figure 4 – Entrance Culvert
5. Figure 5 – Entrance Culvert cross section
6. Figure 6 – Front Lot Drainage
7. Figure 7 – Rear Lot Drainage
8. Figure 8 – Grading Requirement
9. Figure 9 – Subdrain in swales
10. Figure 10 – Typical Underground Cistern Tank
11. Figure 11 – Typical Dry Hydrant