City of Ellsworth
Chapter 56
Unified Development Ordinance

Article 10
Stormwater Management
Design and Construction Standards

Amended November 19, 2012

1001 PURPOSE AND APPLICABILITY

1001.1 Purpose. The purpose of this article is to better manage land development in order to protect, maintain, and enhance the public health, safety, and general welfare of the citizens of Ellsworth by establishing requirements and procedures to control the adverse impacts associated with stormwater runoff.

1001.2 Applicability. This Article shall apply to all minor and major use site development plan projects and to subdivisions. See Section 1003.3 for specific applicability thresholds regarding Flooding and Quality Control Standards.

1001.3 Interpretation. Nothing in this Article shall be construed to prevent the construction of stormwater management infrastructure which meet higher standards or use improved methods or materials of equivalents or higher quality.

1002 PLAN SUBMITTALS

1002.1 Documents. The stormwater management system shall be presented in a narrative and on site plans showing at a minimum:

A. A narrative describing the details of how the stormwater will be managed.

B. The contour lines shown on the plan shall be at an interval of no more than 2 feet.

C. For the Basic Standards, refer to the Maine Department of Environmental Protection Chapter 500, Section 8.C and provide submittal for both the erosion and sedimentation control plan and the inspection and maintenance plan.

D. For the General Standards, refer to the Maine Department of Environmental Protection Chapter 500, Section 8.D with the exception of Section 8.D.(5) and as further specified in this Article.

E. For the Phosphorus Standards, refer to the Maine Department of Environmental Protection Chapter 500, Section 8.D with the exception of Section 8.D.(3) and as further specified in this Article. Note that the Phosphorus Standards can be substituted for the General Standards, per Chapter 500, by recommendation of the City Planner.

F. For the Flooding Standards, provide:

i. Pre- and post-development sub-catchments, time of concentration lines, general water flow lines and ground cover.

ii. Show all existing and proposed culverts, swales, catch basins, detention or retention area and conveyance devices.

iii. Site specific temporary and permanent Best Management Practices

(BMP's) to be used for the project.

G. A stormwater management system maintenance plan and referring note stated on the plan, as well as a Copy of the Declaration and Covenants for any homeowners association charged with the long-term maintenance of the stormwater system.

H. Any related State and Federal permits or permit application.

I. A copy of the Notice of Intent for Construction Activity filled out and submitted to the MDEP.

1002.2 Required Submittal Copies.

A. CEO-approved project: The applicant shall submit two copies of all material to the Code Enforcement Officer.

B. Planning Board-approved project: The applicant shall submit copies of the following material to the Administrator per Article 6 Site Development Plan Section 602.7 unless otherwise specified:

i. The stormwater management system plan and narrative per this Article.

ii. Pre- and post-development conditions and drainage diagrams.

iii. Documentation of application for all related State and/or Federal permits.

iv. A summary of the stormwater design calculations.

v. Three (3) copies of the stormwater calculations and any State or Federal approvals.

vi. The City Planner reserves the right to request more copies as the need may arise.

1003 STORMWATER MANAGEMENT DESIGN STANDARDS

1003.1 Stormwater Management. Adequate provision shall be made for disposal of all stormwater generated, and any drained groundwater through a management system of swales, culverts, under-drains, buffers, storm drains, etc. The stormwater management system shall be designed to conduct stormwater flows to existing drainageways. The intent of this article is for stormwater management systems to provide pollutant removal; cooling; channel protection; and flood control.

Where a street or site is traversed by a stream, river, or surface water drainageway, or where the Administrator determines that surface water runoff to be created should be controlled, there shall be provided easements or drainage rights-of-way with swales, culverts, catch basins or other means of channeling surface water.

1003.2 Professional Design. Stormwater management plans and systems shall be designed by an engineer registered in the State of Maine.

1003.3 Design Criteria and Applicability Thresholds.

A. **Design Criteria:** All stormwater management systems required by this Article shall be designed consistent with the following documents, as applicable. The DEP applicability thresholds are not the thresholds of this ordinance:

i. M.R.S.A 38 § 420-C and 420-D;

ii. The most recent version of the Maine Department of Environmental Protection Stormwater Management Rules (Chapters 500 and 502) and with the following MDEP volumes:

a. *Volume I: Stormwater Management Manual,*

b. *Volume II: Phosphorus Control in Lake Watershed: A Technical Guide to Evaluating New Development; and*

c. *Volume III: BMPs Technical Design Manual*.

Wherever regulations specified in this Article differ from the above-listed documents, the standards of the more restrictive applicable standard shall prevail.

B. **Flooding Control Standard**.

The objective of the Ellsworth Flooding Control Standard is to limit flooding of neighboring properties and water courses to pre-development levels.

i. Applicability.

a. The Ellsworth Flooding Control Standard (described below) applies to all projects that result in 20,000 s. f. or more of impervious surface, as defined herein, on a parcel of land.

b. The Administrator may apply this Flooding Standard to smaller projects where stormwater generated appears to present a threat to neighboring property or water courses. In this decision, the

Administrator shall consider the project's proximity to property lines, topography and downstream conditions and whether it would pose any health or safety threats regarding neighboring properties, roads or drainageways.

ii. Standard – Requirement. The Ellsworth Flooding Control Standard shall be met and requires post-development runoff locations and types to provide the same or less of an impact as those existing in the pre-development condition. Post-development discharge points from a property shall be in the same general location and be of the same type (i.e.: sheet flow, shallow concentrated, etc) as the pre-development discharge locations and types or create an improvement to existing conditions. The Flooding Standard requires a stormwater management plan designed to limit peak flow to predevelopment levels for 2.7 inch and 5.4 inch, 24-hour duration, storm events.

Where an accessway is to be built or upgraded, and may become a public way, the crossing of the stream by the accessway shall be designed to accommodate a 7.1-inch storm event.

iii. Exception to the Standard – Requirement. If all downstream drainageways have the capacity and stability to receive the project's runoff plus any off-site runoff also passing through the system, and drainage easement are secured and the Administrator also makes determination that the areas expected to be flooded by the 2.7 inch and 5.4 inch, 24-hour storm do not pose any health and safety issues such as, but not limited to, the flooding of primary access roads to the project and public roads or an undue burden (i.e. significant difficulty or expense) to property owners likely to suffer specific harm.

C. **Quality Control Standards:**

i. Applicability Threshold. The Ellsworth Quality Control Standards (described in D and E below), apply to all development and redevelopment projects that are:

a. In the Shoreland Zone, or;

b. Discharging within the direct watershed of Card Brook, or:

c. Associated with High Pollutant Land Uses as defined herein, or;

d. Resulting in a parcel of land having 10% or more of impervious area as defined herein.

The objective of the Ellsworth Quality Control Standard is to limit degradation of water quality in lakes and streams through treating runoff from Shoreland Zone areas, high pollutant uses and impervious surfaces exceeding 10% of the area of each watershed. The 10% untreated area is allocated by parcel or parcels involved in an applicable project. Studies have shown that watersheds with 10% to 15% impervious cover tend to have impaired water quality.

ii. Excluded Areas. Impervious and other areas of land surface that are not changed during the course of a development or redevelopment project may be excluded from any quality controls required for the project.

iii. BMP's. Basic Quality Control Standards (described in MDEP documents above) apply to all projects regardless of exemptions described below:

Exemptions.

The following exemptions from Ellsworth Quality Control Standards may be claimed, where applicable. Exempted area shall not include development associated with High Pollutant Land Uses, be within the Shoreland Zone with the exception of the General Development District, or be within the direct watershed of Card Brook.

a. **10% Exemption.** Up to 10% of any parcel may be exempted from the Ellsworth Quality Control Standards. All previously developed impervious surfaces with untreated stormwater count toward the 10%. After this exemption is claimed, the remainder of the lot may not use the exemption, even if it is divided from the developed parcel. Land subdivision projects may only apply the exemption to lands that will be held in common such as roadways and conservation areas.

b. **Extended 10% Exemption**. Where on-site treatment is not practical or desired, additional development area may be exempted from the Ellsworth Quality Control Standards similar to the 10% exemption where appropriate development rights are secured and recorded via permanent easement for lands within the same stream watershed at a 9:1 ratio of lands conserved from pervious development to lands with pervious development exempted from the Ellsworth Quality Control Standards.

Where on-site quality treatment and conservation easements are not practical or desired, the developer may pay a fee in lieu of constructing the required quality controls. The fee payment shall be made to the Ellsworth Fund for Improvements to Water Quality

to be used for within the same stream watershed, or within an impaired stream watershed. The fee is based on 105% of the estimated cost of constructing quality controls on-site and excludes the costs associated with designing such a system. The developer shall submit to the City calculations determining the proposed fee amount. The cost to the City to hire an engineer to review of the proposed fee amount shall be entirely the responsibility of the developer.

c. **100% Redevelopment Exemption**. Projects in the Ellsworth Urban Core and within the direct watershed of the Union River Estuary (below the Leonard Lake Dam), as shown on the map entitled "City of Ellsworth Urban Core in the Direct Watershed of the Union River Estuary," may exempt up to 100% of the existing impervious area with untreated stormwater that is being redeveloped from the Ellsworth Quality Control Standards.

d. **50% Redevelopment Exemption**: Projects outside of areas eligible for the 100% exemption above may exempt up to 50% of the existing impervious area with untreated stormwater that is being redeveloped from the Ellsworth Quality Control Standards.

D. **Union River/Leonard Lake Water Quality Control:** Projects located outside the watershed of a Great Pond or within the watershed of Leonard Lake as shown on the Official City of Ellsworth Watershed Map, shall comply with the most recent version of the Maine Department of Environmental Protection Stormwater Management Rules General Standards, in addition to Basic Standards and the Ellsworth Flooding Control Standards where applicable.

E. **Lake and Stream Water Quality Control:** Projects located within the watershed of a Great Pond and outside the watershed of Leonard Lake as shown on the Official City of Ellsworth Watershed Map, shall comply with the most recent version of the Maine Department of Environmental Protection Stormwater management Rules Phosphorus Standards in addition to Basic Standards and the Ellsworth Flooding Control Standards where applicable.

The Planning Board shall not, as part of the required phosphorus control plan, allow an increase in phosphorus loading beyond the level allowed by the Maine Department of Environmental Protection. Furthermore, no phosphorus mitigation credits or compensation are allowed unless the project triggers the Stormwater Law or Site Law.

1003.4 **Drainage easements** for existing water courses or proposed drainageways shall be provided at least 30 feet wide, conforming substantially to the lines of existing natural drainage.

1003.5 **Upstream drainage**. The stormwater management system shall be designed to accommodate upstream drainage, taking into account existing conditions and approved planned developments not yet built and shall include a surplus design capacity factor of 25% if the potential exists for an increase in upstream runoff.

1003.6 **Downstream Capacity**. The storm drainage shall not overload existing or planned storm drainage systems downstream.

1003.7 **Catch basins** shall be installed where necessary and located at the curb line of accessways or as required elsewhere.

1003.8 **Subsurface drainage**. Where soils require a subsurface drainage system, the drains shall be installed and maintained along with the stormwater drainage system.

1003.9 **Outlets** shall be stabilized against soil erosion by using the Maine Department of Environmental Protection Maine Erosion and Sediment Control BMPs (latest edition) such as stone riprap or other suitable materials to reduce stormwater velocity. Outlets shall not be located closer than 20 feet of a property line.

1003.10 **Landscaped Buffer**: Detention or retention areas created for the stormwater management system shall be landscaped and buffered from adjacent properties if the total area (including the inside of the embankments) is greater than 10,000 square feet.

1003.11 **Level Spreader**: Level spreaders are not permissible if the receiving land of the diffused stormwater has a grade of 2% or greater.

1003.12 **Erosion Control**: An erosion and sedimentation plan shall be submitted as part of any Stormwater Management Plan and for all projects. The procedures outlined in the plan shall be implemented during the site preparation, construction and clean-up stages of the project. The applicant/owner shall be responsible for implementing the plan.

1003.13 **Safety Standards**: Public safety shall be accounted for when designing and maintaining stormwater ponds, facilities, BMPs, culverts and other related facilities as follows:

A. **Safety shelf and Side Slopes.** There shall be a safety shelf around the perimeter of the detention pond to reduce the risk of someone falling into the pond**.** The safety shelf requirement may be waived if slopes are 4:1(horizontal:vertical) or gentler.

B. **Dams and Embankments.** If there are, or there exist the potential for development of, home and businesses in the downstream "dam break"

floodplain, then the dams and embankments shall be designed to withstand overtopping during floods larger than they were designed to detain (6-inch rain over 24 hours).

C. **Outlets.** When feasible, outlets shall be placed away from areas of heavy public use. Outlets are screened so that the public will not be drawn to it. Thick shrubs, grading techniques, and aesthetic fencing or railing can also be used.

D. **Fencing**. Fencing of ponds is not generally desirable, but may be required by the Administrator. A preferred method is to manage the contours of the pond to eliminate drop offs and other safety hazards.

E. **Spill Ways**. The principal spillway opening shall not permit access by small children, and end walls above pipe outfalls greater than 48 inches in diameter shall be fenced to prevent a hazard.

1003.14 **State Permitting**. All projects shall meet the requirements of Maine Department of Environmental Protection permitting.

1003.15 **Inspection**. Prior to final completion and acceptance of the site work portion of a project, or the issuance of a Certificate of Occupancy, the Design Engineer of the stormwater management system shall provide to the Code Enforcement officer a letter stating that they have examined the site and are satisfied that the site and storm-water system are built according to approved plans and will function as intended. The Code Enforcement Officer may require as built-plans where changes have been made from original designs.

1004 CONSTRUCTION MATERIALS AND STANDARDS

1004.1 General. All Construction shall be done in a workmanlike manner and be free from defects and deficiencies. The Code Enforcement officer shall examine the workmanship and have the authority to require removal or replacement of materials not considered satisfactory.

1004.2 Stormwater Management Best Management Practices (BMP's) shall be designed, built and maintained as specified in the Maine Department of Environmental Protection Maine Erosion and Sediment Control BMPs (latest edition).

1004.3 Drain Inlet Alignment shall be straight in both horizontal and vertical alignment unless specific approval of a curvilinear drain is obtained in writing from the City Highway Foreman.

1004.4 Changes in Alignment. Catch Basins shall be provided at all changes in vertical or horizontal alignment and at all junctions. On straight runs, catch basins shall be placed at a maximum of 400-foot intervals.

1004.5 Manholes. Manholes shall be a precast concrete truncated cone section

construction meeting the requirements of ASTM Designation C 478 or precast concrete manhole block construction meeting the requirements of ASTM Designation C 139, radial type. Manhole sections shall have lapped joint construction and support H-20 loading (unless higher loading required for specific application). Bases may be cast in place 3,000 psi 28 day strength concrete or may be of precast, reinforced concrete, placed on a compacted foundation of uniform density. Metal frames and traps shall be set in a full mortar bed with frames and covers meeting the requirements of ASTM A48 Class 30 for gray iron castings. Covers shall be non-rocking, 24-inch diameter and have 3-inch lettering indicating the use (i.e. DRAIN). Frames and Grates shall be of heavy duty construction weighing not less than 300 pounds and machined on both vertical and horizontal seating surfaces.

1004.6 Precast Concrete Catch Basins. ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading, with provision for Bell-and-spigot or tongue-and-groove joints formed on machine rings to ensure accurate joint surfaces.

1004.7 Joint Sealants. ASTM C 990, bitumen or butyl rubber.

1004.8 Grade Rings. Include 2 or 3 reinforced-concrete rings, of 6-inch to 9-inch total thickness that match 24-inch diameter frame and grate.

1004.9 Maximum Trench Width at the pipe crown shall be the outside diameter of the pipe plus 2 feet.

1004.10 Pipe Connectors. ASTM C 923, resilient, of size required, for each pipe connecting to base section.

1004.11 Pipe Sizing. The minimum pipe size for any culvert or storm drainage pipe shall be 15 inches. Smaller pipes may be incorporated into a storm-water management plan if required for detention or retention requirements. If smaller pipes are used the developer shall provide a maintenance plan and schedule that will allow the pipes to provide adequate flow.

1004.12 Pipe (culvert) Bedding and Backfill. Pipes shall be bedded and backfilled in a fine granular material, containing no stones larger than 3 inches, lumps of clay, or organic matter, reaching a minimum of 6 inches below the bottom of the pipe extending to 6 inches above the top of the pipe. Bedding material shall be graded per Table 1004.12.

Table 1004.12 Culvert Backfill Material

Sieve Designation	% By Weight Passing Square Mesh Sieves
3-inch square mesh	100%
1/4 inch	25-70%
#40	0-30%
#200	0-7%

1004.13 Reinforced Concrete Pipe. Reinforced concrete pipe shall meet the requirements of ASTM Designation C-76 (AASHTO M 170). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.2 on the .01-inch crack strength with a Class B bedding. Joints shall be of the rubber gasket type meeting ASTM Designation C 443-70. Perforated concrete pipe shall conform to the requirements of AASHTO M 175 for the appropriate diameter. Elliptical pipe

shall conform to the requirements of AASHTO M207M/M207. Pipe arch shall conform to the requirements of AASHTO M206M/206.

1004.14 Corrugated Metal Pipe. Aluminum coated corrugated steel pipe and special fittings such as elbows, tees, and wyes shall conform to the requirements of the Maine Department of Transportation Standard Specifications, Subsection 707.10 (Type 2), Aluminum Coated (Type 2) Corrugated Steel Pipe. Pipe gauge shall be as required to meet the soil and traffic loads with a deflection of not more than 5%. Fittings shall be fabricated to types required and according to same standards as pipe. Connecting bands shall be standard couplings made for corrugated-steel pipe to form soil-tight joints.

1004.15 Corrugated Plastic Pipe. Pipe culverts and storm drains so designated shall conform to the requirements of Maine Department of Transportation Standard Specifications, Subsection 603 and 706.06 (special provisions). Corrugated Polyethylene pipe will meet the requirements of AASHTO M294 (ASTM F2648 may also be used with regard to pipe materials for all Polyethylene pipe) type S, Dual Wall. Corrugated Polyethylene pipe (and fittings) for Underdrain shall conform to AASHTO M252, slot perforated, for 6-inch diameter and to AASHTO M294 for 12-inch to 30-inch. Pipe to be used for Underdrain Type C shall be perforated in accordance with the applicable requirements of AASHTO M36/M36M Type III, Class I perforations. Pipe shall be corrugated with an integrally formed smooth waterway and be non-perforated or perforated as indicated on the drawings. Installation shall include all necessary boots, gaskets and adapters required to provide a soil-tight connection at all manholes, joints and fittings. Pipe shall have integral bell-and-spigot joint meeting the requirements of ASTM F 477 or approved equal.

1004.16 Cast Iron Catch Basin Frames and Covers shall be cast of material conforming to the requirements of ASTM A48 Grade 30 and be of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. They shall be smooth and well-cleaned by shotblasting or other approved method. They shall be of heavy duty construction weighing not less than 400 pounds and machined on both vertical and horizontal seating surfaces. Frames shall be 4-flange unless inlet curb inlet is specified, in which case they shall be 3-flange. Grates shall be non-rocking and be of appropriate entry configuration for the intended location.

1004.17 System Cleaning. Upon completion of system construction, each catch basin or manhole shall be cleaned of all accumulation of silt, debris or foreign matter and shall be kept clean until final acceptance.

1004.18 Alternative Catch Basins and Manholes. Alternative materials for catch basins and manholes may be submitted for approval to the Administrator. Such submittals shall be reviewed on a case-by-case basis and may require an independent professional review to determine applicability and long term durability.