SSTEM Reciprocal Mentoring Experience: City of Houghton and Portage Township Stormwater Management Ordinance

Final Report
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Michigan Tech SSTEM Program
Background

In 2009, Michigan Tech’s Center for Water and Society (CWS) published the Huron Creek Watershed Management Plan (WMP) as a result of a grant from the U.S. Environmental Protection Agency Section 319 Clean Water Act, in conjunction with the Michigan Department of Environmental Quality (MDEQ) Clean Michigan Initiative (CMI) program (Center for Water and Society, 2009). The plan identified several water quality problems resulting from stormwater, and recommended adoption of a stormwater ordinance as the best means of preventing further degradation of water resources. A draft stormwater management ordinance was presented to the City of Houghton’s Planning Commission (Appendix A) which was developed from the ordinance provided in the WMP (Appendix B) based on ordinances currently implemented in two cities in lower Michigan (DeWitt and West Branch). The same draft will be presented to the Portage Township Board of Commissioners on May 9, 2011.

The WMP identified sedimentation, flashy flow, and excessive nutrients as the issues of concern resulting from stormwater runoff. Lack of stormwater controls can result in increased flooding and property damage, stream channel degradation, lower groundwater recharge and reduced dry weather streamflow, and impaired water quality through sediment suspension, and transport and accumulation of pollutants (Southeast Michigan Council of Governments, 2008). Stormwater damage can be reduced or eliminated by implementing practices which control the release (quantity) of stormwater in addition to maintaining high water quality.

The objective of this project was to develop a stormwater management ordinance for the City of Houghton and Portage Township, as part of a larger research project examining regional sustainable water issues (see Huron Creek Stormwater Management SSTEM final report by T. Beaster, S. Johnson and M. Jackson, 2011).

Methodology

On February 10, 2011, representatives from the City of Houghton, Charter Township of Portage, Houghton County Drain Commission, Michigan Department of Environmental Quality, and students and faculty from Michigan Tech met to begin development of a stormwater management ordinance for the municipalities of the City of Houghton and Portage Township. Over the next three months, a draft stormwater ordinance was developed that addressed issues unique to both jurisdictions. Development of the ordinance was conducted by the stormwater ordinance working group, comprised of Jay Green (Houghton City Planning Commission), Bruce Petersen (Portage Township Supervisor), Tristan Beaster, Meral Jackson, and Seth Johnson (Michigan Tech students and SSTEM Scholars). Meeting agendas and minutes documenting the progression of the ordinance from the draft provided in the WMP to the version presented to the Planning Commissions are provided in Appendix C. The working group revised the ordinance content primarily addressing design criteria and standards, leaving the majority of the permitting, enforcement and maintenance sections for refinement by the City and Township planning commissions.
Results and Discussion

As of April 27, 2011, the draft City of Houghton and Portage Township Stormwater Management Ordinance has been presented to the City of Houghton Planning Commission to petition further development and adoption. It is the hope of the group that the ordinance will be adopted during the 2011 calendar year. Dr. Alex Mayer and Meral Jackson are scheduled to present the draft ordinance to the Portage Township Board of Commissioners on May 9, 2011. Further information can be found in the appendices, including (1) the current draft ordinance (Appendix A), (2) the original draft ordinance included in the Huron Creek Watershed Management Plan (Appendix B) and (3) meeting agenda and minutes (Appendix C).

Conclusion

The design criteria and standards have been tailored to include issues specific to both the City of Houghton and Portage Township. The process of developing a stormwater ordinance can be a lengthy process, but many resources exist to facilitate development and adoption of a stormwater ordinance. Public participation in local governance can be undertaken by interested individuals, but backing by an established organization or individuals facilitates the process. The authors would like to extend their appreciation for the numerous hours researching, deliberating, and compromising that Jay Green and Bruce Peterson endured during the duration of the process. This ordinance could not have been completed without them and the advice and support of Alex Mayer.

Outcomes

Should the City of Houghton and Portage Township both adopt the proposed ordinance, this partnership would be the first regional example of community planning that crosses multiple jurisdictions. This event would set the stage for additional cooperative projects and management for other jurisdictions in the region to follow. By working in unison, additional avenues for funding for local and regional projects will be available that each unit of government, on their own, might not be able to obtain. Rural communities such as the Copper Country will have more control over their socioeconomic and governance issues by working as partners than if they try to accomplish each task individually. This partnership empowers communities, creating vibrant, sustainable communities that are proactive, progressive, and can provide high quality of life for residents.

References


Appendix A
Stormwater Management Ordinance

DRAFT

City of Houghton
Portage Township
Draft
April 25, 2011
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ARTICLE 1 - GENERAL

1.1 Statement of Authority

This ordinance is adopted in accordance with the Home Rule City Act, as amended, being MCL 117.1, et seq.; the Drain Code of 1956, as amended, being MCL 280.1, et seq.; the Land Division Act, as amended, being MCL 560.1, et seq.; the Revenue Bond Act, as amended, being MCL 141.101, et seq.; and the Natural Resources and Environmental Protection Act, as amended, being MCL 324.101, et seq.; Section 401(p) of the Federal Water Pollution Control Act (also known as the Clean Water Act), as amended, being 33 USC 1342(p) and 40 CFR Parts 9, 122, 123 and 124; and other applicable state and federal laws.

This ordinance shall be known and may be cited as the City of Houghton and Portage Township Stormwater Ordinance.

1.2 Findings

The City of Houghton and Portage Township find that:

1) Water bodies, roadways, structures, and other property within the City of Houghton and Portage Township are at times subjected to flooding.
2) Flooding is a danger to the lives and property of the public and is also a danger to the natural resources of the City of Houghton, Portage Township and the region.
3) Land development alters the hydrologic response of watersheds, resulting in increased stormwater runoff rates and volumes, increased flooding, increased stream channel erosion, and increased sediment transport and deposition.
4) Stormwater runoff produced by land development contributes to increased quantities of waterborne pollutants.
5) Increases of stormwater runoff, soil erosion, and non-point source pollution have occurred as a result of land development, and cause deterioration of the water resources of the City of Houghton and Portage Township.
6) Increased stormwater runoff rates and volumes, and the sediments and pollutants associated with stormwater runoff from future development projects within the City of Houghton and Portage Township will, absent reasonable regulation and control, adversely affect the City of Houghton and Portage Township’s water bodies and water resources.
7) Stormwater runoff, soil erosion, and non-point source pollution can be controlled and minimized by the regulation of stormwater runoff from development.
8) Adopting the standards, criteria and procedures contained in this ordinance and implementing the same will address many of the deleterious effects of stormwater runoff.
9) Adopting these standards is necessary for the preservation of public health, safety and welfare.
1.3 Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls to accomplish, among others, the following objectives:

1) To reduce artificially induced flood damage;
2) To minimize increased stormwater runoff rates and volumes from identified new land development;
3) To minimize the deterioration of existing watercourses, culverts and bridges, and other structures;
4) To encourage water recharge into the ground where geologically favorable conditions exist;
5) To prevent an increase in non-point source pollution;
6) To maintain the integrity of stream channels for their biological functions, as well as for drainage and other purposes;
7) To minimize the impact of development upon streambank and streambed stability;
8) To reduce the adverse impact of changing land use on water bodies and, to that end, this ordinance establishes minimum standards to protect water bodies from degradation resulting from changing land use where there are insufficient stormwater management controls.

1.4 Applicability, Exemptions and General Provisions

This ordinance shall apply to any development site which requires approval of a plat or site development plan, or any other permit for work which will alter stormwater drainage characteristics of the development site, provided, however, that this ordinance shall not apply to the following:

1) Agricultural activity or silvicultural practice that is consistent with an approved Natural Resources Conservation Service conservation plan;
2) Additions or modifications to any single family or duplex structure;
3) Landscaping or gardening involving less than 1 acre of land;
4) Construction of a single family or duplex structure on a legal lot within a development that itself previously received approval under this ordinance provided that less than 1 acre of land is cleared or graded for such construction;
5) Construction of a single family or duplex structure on a legal lot that existed prior to this ordinance provided that less than 1 acre of land is disturbed.

1.5 Responsibility

The City/Township is not responsible for providing drainage facilities on private property for the management of stormwater on the private property. It shall be the responsibility of the property owner to maintain private stormwater facilities serving the property and to prevent or correct the accumulation of debris, which interferes with the drainage or stormwater management function of the system.
1.6 Wetland Permitting

Stormwater projects by their nature are usually found at the lowest point in the landscape, so developers need to become familiar with wetland regulatory parameters before undertaking any sort of stormwater Best Management Practice within these low lying areas.

Developers must be aware of the Michigan Department of Natural Resources/Michigan Department of Environmental Quality and U.S. Army Corp of Engineers definitions of wetlands. These regulatory entities oversee and regulate wetlands. Permits may be required from these regulators.

1.7 Definitions

For the purpose of this ordinance, the following words and phrases shall have the meanings respectively ascribed to them by this section unless the context in which they are used specifically indicates otherwise:

1) Best Management Practice (BMP) - A practice, or combination of practices and design criteria that comply with the most recent edition of the following manuals:
   a. Michigan Department of Environmental Quality (MDEQ) Guidebook of BMPs for Michigan Watersheds,
   b. MDEQ Stormwater Management Guidebook,
   c. Southeast Michigan Council of Governments (SEMCOG) Low Impact Development (LID) Manual, or
   d. Equivalent practices and design criteria that accomplish the purposes of this ordinance (including, but not limited to minimizing stormwater runoff, removing pollutants from stormwater, and preventing the discharge of pollutants into stormwater).

2) Changes in land use - Any land use change, including, but not limited to, construction, earth change, and redevelopment.

3) Construction site stormwater runoff - Stormwater runoff from a development site following an earth change.

4) Cut - An earth change which lowers topography or removes soil.

5) Design storm - A precipitation event of a designated amount and/or frequency. Typically used in a regulatory setting to designate required design criteria for stormwater facilities.

6) Detention - A system, which is designed to capture stormwater and release it over a period of time through an outlet structure at a controlled rate.

7) Detention basin - A designed facility which stores and detains runoff and releases water at a controlled rate. These basins may be dry between runoff events or may be "wet bottom," where a base water level occurs below the elevation of the outlet structure.

8) Developed or development - The installation or construction of impervious surfaces on a site that require, pursuant to state law or local ordinance, the City/Township approval of a site plan, plat, site condominium, special land use, planned unit development, land division approval, private road approval or other approvals required for the development of land or the erection of buildings or structures; provided, however, that for purposes of this ordinance only, developed or development shall not include exemptions per subsection 1.4.

9) Discharge - The rate of flow passing a given point, expressed as cubic feet per second.
10) **Disturbed area** - The surface of land from which vegetation has been disturbed, removed and/or subjected to earth moving activities.

11) **Drainage** - The collection, conveyance, or discharge of ground water and/or surface water.

12) **Drainage area** - The contributing watershed, which is expressed in acres or square miles.

13) **Earth change** - Any human activity which removes ground cover, changes the slope or contours of the land, or exposes the soil surface to the process of erosion. Earth change includes, but is not limited to, any excavating, surface grading, filling, landscaping, spoil piles, or removal of vegetative roots.

14) **Erosion** - The process by which the ground surface is worn away by action of wind, water, gravity or a combination thereof.

15) **Extended detention basin** – A detention basin that releases a 24-hour storm event over a minimum of 48 hours after the conclusion of the event.

16) **Fill** - Earth or other materials added to existing topography.

17) **First flush** - The term given to the initial runoff quantity, having the highest pollutant concentration, which is contained in the first 1/2 inch of precipitation.

18) **Forebay** – A depression near the entrance to a basin where coarse sediments are deposited.

19) **Grading** - Any stripping, excavating, or filling of soil, or any combination thereof, and the land in its excavated or filled condition.

20) **Impervious** - The ground condition (e.g. roads, parking lots, sidewalks, and rooftops) which does not allow percolation or infiltration of precipitation, which results in nearly 100% runoff.

21) **Infiltration** - The percolation and movement of water downward into and through the soil profile. The rate of this movement is expressed in inches per hour.

22) **Non-point source** - Any discharge that does not meet point source criteria.

23) **Offsite facility** - Any portion of a stormwater management system which is located off the development site which it serves.

24) **100-year storm** - A storm event having a 1 percent probability of occurrence in any given year. Thus, a 50-year storm has a two percent probability, a ten-year storm a ten percent probability, etc.

25) **Ordinary High Water Mark** - The point on a streambank, lakeshore, or other waterbody shoreline to which the presence and action of surface water is so continuous as to leave a distinct mark of erosion; destruction or prevention of woody terrestrial vegetation; predominance of aquatic vegetation; or another easily recognized characteristic.

26) **Peak discharge rate** - The maximum rate of stormwater flow from within a drainage area expressed as cubic feet per second.

27) **Point source** - A discharge that is released to the surface waters of the State by a discernible, confined and discrete conveyance, including, but not limited to, a pipe, ditch, channel, tunnel, conduit, and well.

28) **Presettlement** – Time period before significant human change to the landscape. For the purpose of this ordinance, presettlement can also be used as the presettlement site conditions.

28) **Property owner or legal representative** - Any person, firm or corporation having legal or equitable title to property or any person having or exercising care, custody, or decision making control.

29) **Retention** - A system, which is designed to capture stormwater runoff and contain it until it infiltrates the soil or evaporates.

30) **Retention basin** - A stormwater management facility, either natural or manmade, which captures and holds runoff directed into it and does not have an outlet.
31) **Runoff** - The portion of precipitation which does not infiltrate or percolate into the ground, but rather moves over the land, eventually reaching a waterbody, wetland, or low area.

32) **Sediment** - Any solid particulate matter which has been moved from the site of origin by erosion, is being transported by water, is in suspension in water, or has been deposited in a water body, wetland or floodplain.

33) **Sheetflow** - Overland runoff which moves relatively uniformly over the ground surface rather than being concentrated in a conveyance channel.

34) **Site** - Any tract, lot, or parcel of land or combination of tracts, lots, or parcels, which compose an area proposed for development and/or earth change.

35) **Soil erosion and sedimentation control** - Structures, facilities, barriers, berms, vegetative cover, basins, and/or any other installation, temporary or permanent, which are designed to minimize and prevent erosion and off-site sedimentation.

36) **Storm drain** - A system of open or enclosed conduits and appurtenant structures intended to convey or manage stormwater runoff, ground water and drainage.

37) **Stormwater facility** - Structures, BMPs, areas, or related items, which are used to control, store, receive, infiltrate, or convey runoff.

38) **Stormwater runoff** - The runoff and drainage of precipitation resulting from rainfall, snowmelt or other natural event or process.

39) **Time of concentration** - Time required for water to flow from the most remote point of a watershed to a design or discharge point. Flow paths, ground surface slope and roughness, and channel characteristics affect this time.

40) **Watershed** - The total land area which contributes runoff, or is within such an area, to a common outlet, such as a lake or stream. Also known as the drainage area or catchment.

41) **Wetland** - Land composed of hydric soils, characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation and/or aquatic life. Hydric soils are saturated or ponded long enough to exhibit anaerobic conditions. These areas are generally referred to as; bogs, fens, swamps, marshes, etc. (from § 324.30301 of Michigan Compiled Laws, Part 303 of NREPA, Wetlands Protection). The Michigan Department of Environmental Quality and the U.S. Army Corp of Engineers are the authorities on the presence and regulatory status of wetlands.

### ARTICLE 2 – STORMWATER PERMITS

#### 2.1 Permit Required

1) A developer or property owner shall not engage in any development without first receiving a stormwater permit from the City of Houghton/Portage Township pursuant to Article 2.3. To receive a City/County building permit all applicable local, State and Federal permits must be obtained, including all required wetland permits.

2) The granting of a stormwater permit shall authorize only such development for which the permit is required, subject to the terms of the permit, and it shall not be deemed to approve other development or other land use activities.

#### 2.2 Planning Commission Review
1) The City of Houghton/Portage Township’s Planning Commission shall review the stormwater management plan to determine compliance with the conditions contained in Article 2.3.

2) The City of Houghton/Portage Township’s Planning Commission may add conditions for approval of the plan.

3) If the City of Houghton/Charter Portage Township’s Planning Commission determines that all required information has not been received, the applicant may request that the matter be tabled, and the Planning Commission may, at their discretion, with or without such a request, table the matter to allow for the submittal of the required information.

4) The authority to grant final approval for a stormwater management plan shall be vested with the Houghton City Council/Portage Township Board for all types of projects.

2.3 Conditions of Approval

The Houghton City Council/Portage Township shall grant a stormwater permit, which may impose terms and conditions in accordance with Article 2.10, and which shall be granted only upon compliance with each of the following requirements:

1) The developer has submitted a stormwater management plan complying with Article 2.4;
2) The drainage plan contains a description of adequate construction site erosion and runoff control methods, satisfying the requirements of Article 2.7, and the developer has obtained a soil erosion permit, if necessary;
3) The stormwater management plan conforms with all applicable design and performance standards for stormwater management systems, as set forth in Article 3;
4) All stormwater facilities are designed in accordance with the most current BMPs;
5) The developer has paid or deposited the stormwater permit review fee(s) pursuant to Article 2.6;
6) The developer has paid or posted the applicable financial guarantee pursuant to Article 2.8;
7) The developer provides all easements necessary to implement the approved drainage plan and to otherwise comply with this Ordinance. All easements shall be acceptable to the City of Houghton/Portage Township in form and substance and shall be recorded with the Houghton County Register of Deeds;
8) For commercial and industrial developments, the developer provides the required maintenance agreement for routine, emergency, and long-term maintenance of all stormwater runoff facilities and in compliance with the approved drainage plan and this Ordinance. The maintenance agreement shall be acceptable to the City of Houghton/Portage Township in form and substance and shall be recorded with the Houghton County Register of Deeds;
9) Appropriate governing bodies’ approval of the stormwater management plan and facilities does not connotate approval of other state and federal laws such as Part 301, Part 303, Part 31, Construction Site Storm Water.

2.4 Stormwater Management Plan Requirements

1) General Plan Requirements:
   a. Through maps, illustrations, reports, and calculations, the stormwater management plan shall display the required information in a clear and logical sequence. The stormwater management plan shall be sufficiently detailed to specify the type,
location, and size of all erosion control and stormwater facilities, including calculations.

b. The stormwater management plan shall be drawn to a scale of at least one inch equal to 40 feet (1 inch = 40 feet) for property less than three acres and one inch equal to one hundred feet (1 inch = 100 feet) for property three acres or more in size.

2) Plan submittal requirements:

a. The following plan requirements are in addition to other requirements specified in Articles 3.1 and 3.2. The applicant shall provide a stormwater management plan to the City/Township for review and approval. Upon request by the applicant, or at its own initiative, the Houghton City Council/Portage Township may determine that one or more requirements may not be applicable and may be waived. Applicant shall submit 3 copies of the stormwater management plan, which shall identify and contain all of the following information:

i. Contact information - The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected. Include information on the zoning classification of the applicant's parcel and all adjacent parcels.

ii. Location map - A map depicting the location of the development site and all water bodies or municipal stormwater sewer system that will ultimately receive stormwater runoff.

iii. Topographic base map - The existing and proposed topography of the development site, including the alignment and boundary of the natural drainage courses, with contours having a maximum interval of not greater than two feet. The map shall also show existing surface water drainage (permanent and intermittent) and flow direction, including streams, ponds, culverts, ditches, and wetlands; location of 100-year floodplain, if applicable to the site; current land use including all existing structures; locations of utilities, roads, and easements; designated natural areas; any proposed environmental mitigation features.

iv. Soils information - The site soil information from the Houghton County Soil Survey Map.

v. Watershed - A map showing the drainage boundary of the proposed development and/or earth change, and each point of discharge from the development and/or earth change.

vi. Calculations - Stormwater calculations shall be provided in accordance with the design standards referenced in Article 3.

vii. Site plan drawing - A drawing showing all proposed stormwater facilities with existing and final grades. This map shall also show existing and proposed lot lines, property lines, easements, structures, parking areas and adjacent landowners, etc. on the parcel and within 100 feet of the site.

viii. Outlet and culvert information - The sizes and locations of upstream culverts adjacent to the site serving the major drainage routes flowing into the development site. Any significant offsite and onsite drainage outlet restrictions other than culverts should be noted on the drainage map. Storm sewer calculations indicating the number of acres, calculated to the nearest tenth of an acre, contributing to each specific inlet/outlet and maximum
flow in cubic feet per second shall be stated on the plan. Any areas of offsite sheet flow shall also be identified.

ix. **Construction plan** - An implementation and sequencing plan for construction and inspection of all stormwater facilities, including a schedule of the estimated dates of completion of the stormwater facilities shown on the plan.

x. **Sedimentation and erosion control plan** - A soil erosion and sedimentation control plan shall meet the requirements as outlined in Article 2.7. This plan shall provide the effective control of construction site stormwater runoff and sediment track-out onto roadways.

xi. **Plans and specifications** - All plans and specifications should have a cover sheet containing signature blocks, an index, etc.

xii. **Maintenance plan** - A document in form and substance acceptable to the City of Houghton/Portage Township for ensuring maintenance of any privately or publicly owned stormwater facilities. The maintenance plan shall include a mandatory association or other enforceable commitment to provide routine, emergency, and long-term maintenance of the facilities and, in the event that the facilities are not maintained in accordance with the approved stormwater management plan, the maintenance plan shall authorize the City of Houghton/Portage Township to maintain any onsite stormwater facility as reasonably necessary, at the owner's expense.

xiii. **Firm contact information** - Name and signature of the licensed professional engineer who has assisted in the preparation of the stormwater management plan, designed the stormwater facilities, and will inspect the final construction of the stormwater facilities. The submitted plan shall be stamped and signed by the licensed design engineer.

xiv. **Vegetation plan** - A drawing, which details the existing vegetation to remain and protective measures to be undertaken during construction.

 xv. **Other environmental permits** - All other applicable state and federal environmental permits shall be acquired for the site prior to construction.

xvi. **Additional Fees** - Payment of applicable review fees is required before any review will commence.

xvii. **Phased development plans** - Should the applicant plan to subdivide or develop a given area but wishes to begin with only a portion of the total area, the original preliminary plan will include the proposed general layout for the entire area. The first phase of the subdivision will be clearly superimposed upon the overall plan in order to illustrate clearly the method of development and/or earth change that the applicant intends to follow. However, the stormwater management plan shall be submitted for the entire development, with calculations and devices designed for buildout sufficient to demonstrate to the Houghton City Council/Portage Township the feasibility of future phases complying with the standards of this ordinance.

xviii. **Previously developed sites** - Previously developed sites shall meet the criteria the same as undeveloped sites.

xix. **Inspections** - The City of Houghton/Portage Township has the right to do periodic inspections throughout the construction process.
Acceptance by the City of Houghton/Portage Township - Upon satisfactory final inspection the City of Houghton/Portage Township will accept the facility, and provide a letter of acceptance.

2.5 Approved Plans and Amendments

1) Approved plans - Approval of final development plans, site plans, and final preliminary subdivision plats shall not be granted prior to approval of the stormwater management plan. Upon approval of the sealed stormwater management plan, the Mayor/Township Supervisor shall sign two copies thereof. One signed copy shall be made a part of the City of Houghton/Portage Township's files; and one copy shall be returned to the applicant.
   a. City Council/Township approval shall expire one year from the date of such approval, unless construction has commenced and proceeds satisfactorily.

2) Amendments - Amendments to an approved stormwater management plan may occur only under the following circumstances:
   a. The holder of an approved plan shall notify the development official of any proposed amendment to such approved plan.
   b. Minor changes may be approved by the development official upon certification in writing to the Houghton City Council/Portage Township that the proposed revision does not alter the basic design nor any specified conditions of the plan as agreed upon by the Houghton City Council/Portage Township. The development official shall consider the following to be a minor change:
      i. Any change that does not decrease the effectiveness of approved stormwater facilities.
      ii. Any change that does not cause an increase in runoff rate and/or volume.
      iii. Any change deemed to be minor as determined by the Houghton City Council/Portage Township from time to time.
   c. Should the development official determine that the requested modification to the approved plan is not minor, then the applicant shall submit a new plan for review as required by this ordinance.

2.6 Stormwater Permit Review Fees

1) All expenses and costs incurred by the City of Houghton/Portage Township directly associated with processing, reviewing and approving or denying a stormwater permit application shall be paid (or reimbursed) to the City of Houghton/Portage Township from the funds in a separate escrow account established by the developer, as provided in Subsection 2.

2) The City of Houghton/Portage Township may draw funds from a developer's escrow account to reimburse the City of Houghton/Portage Township for out-of-pocket expenses incurred by the City of Houghton/Portage Township relating to the application. Permit fee structure to be developed by City/Township staff.

2.7 Construction Site Runoff Controls

Prior to making any earth change on a development site regulated by this ordinance, the developer shall first obtain a soil erosion permit issued in accordance with Part 91 of Act No. 451 of the Public Acts of 1994, as amended, if one is required. The developer shall install stormwater
runoff facilities and shall phase the development activities so as to control sediment/construction site stormwater runoff and off-site sedimentation.

2.8 Financial Guarantee of Construction of Stormwater Facilities

1) The City of Houghton/Portage Township shall not approve a stormwater permit until the developer submits to the City of Houghton/Portage Township, in a form and amount satisfactory to the City of Houghton/Portage Township, a letter of credit or other financial guarantee for the timely and satisfactory construction of all stormwater runoff facilities and site grading in accordance with the approved drainage plan. Upon certification by a registered professional engineer that the stormwater runoff facilities have been completed in accordance with the approved stormwater management plan, the City of Houghton/Portage Township may release the letter of credit, or other financial guarantee subject to final City of Houghton/Portage Township acceptance and approval.

2) Except as provided in subsection 3, the amount of the financial guarantee shall be $__________, unless the City of Houghton/Portage Township determines that a greater amount is appropriate, in which case the basis for such determination shall be provided to the developer in writing. In determining whether an amount greater than $__________ is appropriate, the City of Houghton/Portage Township shall consider the size and type of the development, the size and type of the on-site stormwater system, and the nature of the off-site stormwater runoff facilities the development will utilize.

3) This ordinance shall not be construed or interpreted as relieving a developer of its obligation to pay all costs associated with on-site private stormwater runoff facilities as well as those costs arising from the need to make other drainage improvements in order to reduce a development’s impact on a drain consistent with adopted design standards.

2.9 No Change in Approved Facilities

Stormwater runoff facilities, after construction and approval, shall be maintained in good condition, in accordance with the approved drainage plan, and shall not be subsequently altered, revised or replaced except in accordance with the approved drainage plan, or in accordance with approved amendments or revisions in the plan.

2.10 Terms and Conditions of Permits

In granting a stormwater permit, the City of Houghton/Portage Township may impose such terms and conditions as are reasonably necessary to effectuate the purposes of this ordinance. A developer shall comply with such terms and conditions.

ARTICLE 3 – DESIGN AND CONSTRUCTION STANDARDS

3.1 Performance and General Standards

All developments and earth changes subject to review under the requirements of this ordinance shall be designed, constructed, and maintained to control runoff, prevent flooding and protect water quality. The particular facilities and measures required onsite shall reflect the natural features, wetland, and watercourses on the site; the potential for onsite and offsite flooding,
water pollution, and erosion; and the size of the site.

All post-development peak flow shall meet presettlement peak flow while addressing first flush water quality. All discharges must be addressed from the site in question, while riparian rights are maintained.

1) General standards – The standards for onsite and offsite stormwater management are:

   a. Stormwater facilities shall be designed to prevent flood hazards and water pollution related to stormwater runoff, soil erosion and channel erosion from the proposed earth change.

   b. Existing stormwater from upstream and offsite locations shall be safely conveyed around or through the site, or stored onsite. Existing offsite flow that contributes to onsite flow shall be incorporated into the proposed BMP onsite calculations.

   c. Every stormwater facility shall control the release of stormwater in accordance with the design standards listed in this ordinance.

   d. Unless otherwise approved, stormwater runoff shall be conveyed through swales and vegetated buffer strips so as to decrease runoff velocity, to allow for natural infiltration and passive storage, to allow suspended sediment particles to settle, and to remove pollutants.

   e. Cutting, filling, and grading shall be minimized and the natural topography of the site shall be preserved, except where specific findings demonstrate that major alterations will still meet the purposes and requirements of this ordinance.

   f. Grading of lands at locations that are adjacent to or nearby public or private property shall be done in a manner to protect the property from settling, cracking or sustaining other damage.

   g. All development involving earth changes shall be designed, constructed, and completed so that the exposed area of any disturbed land is exposed for the shortest possible period of time.

   h. Developers of residential subdivisions shall provide stormwater facilities that account for the total buildout of the subdivision, including but not limited to: projected roof, lawn and driveway areas, and all new roads.

   i. Developers of commercial or industrial areas shall provide stormwater facilities for all proposed improvements. For subdivided commercial or industrial lots, future developers/owners will be responsible for their proposed development. However, the planning commissions may request evidence that future development can reasonably accommodate facilities to meet the requirements of this ordinance.

   j. Any other zones to address? see additional ordinances; triplexes, larger apartments, etc., commercial/industrial/multifamily developments.

2) Stormwater facilities - The types of stormwater facilities are listed in order of preference, with the most desirable listed first. Stormwater infiltration facilities and/or storage, which protect water quality and minimize flooding, shall be designed to meet the standards of this ordinance. Infiltration and storage facilities may include, but are not limited to, infiltration trenches, bioretention structures, retention basins, wet and dry detention basins and other facilities and/or BMPs proposed by the applicant. It shall be the responsibility of the applicant to demonstrate that all proposed facilities meet the intent, goals, and standards of this ordinance.
a. **Infiltration facilities** - This ordinance encourages the use of infiltration systems as a part of stormwater management plan design. The following areas and conditions are considered inappropriate for use of stormwater infiltration:

i. Fueling and vehicle maintenance and storage areas.

ii. Areas with less than 3 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.

iii. Areas with runoff from industrial, commercial and institutional parking lots and roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.

iv. Areas within 400 feet of a community water system well or within 100 feet of a private well.

v. Any area where the soil between the bottom of the infiltration system and seasonal high groundwater or the top of bedrock is a clean sand (consisting of less than 10% silt/clay sized soil particles).

Stormwater management plan designers shall consider the above criteria including soil permeability and the safe-guarding of soil structure during saturated periods designing stormwater infiltration components of a management system. The site developer shall attempt to minimize compaction of soil. Compaction decreases infiltration and groundwater recharge and contributes to increased stormwater runoff.

b. **Stormwater storage facilities** - All retention and/or detention basins shall be designed to meet the standards of this ordinance. The types of basins are listed in order of preference, with the most desirable listed first:

i. *Wet basins or detention basins*, which have a fixed minimum water elevation between runoff events. Wet basins trap soil particles onsite; they are preferable to dry basins.

ii. *Extended detention basins*, which hold stormwater from a less frequent storm event over an extended period before completely draining to become a dry basin. Dry basins without extended detention shall not be permitted.

iii. *Detention basins*, which detain a storm event and attenuate its release over an extended period.

### 3.2 Design and Performance Standards

For additional design and performance assistance to meet this ordinance, the MDEQ BMP, MDEQ Stormwater Guidebook, and SEMCOG LID manual, as referenced in section 1.7(1), may be utilized.

1) **Rate of Peak Discharge** – By design, stormwater facilities shall be employed to maintain or reduce the peak runoff discharge rate following the same rainfall, as compared to pre-development conditions applicable to the post-construction site.

2) **Volume of Total Discharge** – Where infiltration facilities are appropriate for use according to Article 3.1(3)a, the post-development total runoff volume shall approximate the presettlement total runoff volume following the same rainfall. Where infiltration facilities are not appropriate for use according to this ordinance, the increased volume of water.
discharged due to earth changes and/or development of the site shall not create adverse impacts to property owners and watercourses. These adverse impacts may include, but are not limited to: flooding, excessive soil saturation, crop damage, erosion, water quality impairment or wildlife habitat damage.

3) **First Flush from Impervious Surfaces** – First flush must be contained within an infiltration or extended detention basin. When first flush containment is at capacity, excess flow must bypass first flush containment.

4) **Detention, Extended Detention and Retention Basin Design** - Detention and retention basins shall be designed to hold runoff from the largest-sized 24-hour storm event. All basins:
   a. Shall be permanently stabilized to minimize erosion;
   b. Shall have an overflow system;
   c. Basins and associated berms and landscaping shall be designed to protect public safety and to be visually attractive;
   d. Shall include a forebay depression;
   e. Shall be provided in platted outlots, common areas or open space areas.

5) **Design Storm Events** - The following National Weather Service rainfall data shall be used when completing runoff calculations for locations within the City of Houghton and Portage Township:
   a. 2-year, 24-hour Type II storm = 2.4 inches.
   b. 25-year, 24-hour Type II storm = 3.75 inches.
   c. 50-year, 24-hr Type II storm = 4.3 inches.
   d. 100-year, 24-hour Type II storm = 4.75 inches.

6) **Runoff Calculations**: 
   a. Methods - All stormwater runoff calculations shall be completed using the USDA-Natural Resources Conservation Service (NRCS) NEH Part 630 methodology, or equivalent methodology.
   b. Submittals – To demonstrate compliance with performance standards indicated in Articles 3.2(1), 3.2(2), 3.2(3) and 3.2(4) above, calculations must be supplied for, at a minimum, the four storm events listed in 3.2(5).

3.3 **Landscaping and Vegetation**

For further assistance regarding landscaping and vegetation, see the SEMCGOG LID manual. Within the City of Houghton, vegetative materials used must adhere to the city’s Landscape ordinance.

An applicant shall address the following guiding principles and standards:

1) Native, natural existing vegetation shall be retained where possible. Non-native species chosen for site vegetation shall be reviewed to ensure they have not been identified as invasive.

2) Native species shall be used for re-vegetation and landscaping when possible.

3) The flood and salt tolerance of proposed species shall be considered, particularly in stormwater management areas and components.
4) Water requirements of species proposed in areas other than stormwater management facilities shall be considered, with the goal of reducing their water demand and nutrient requirements.

3.4 Buffer Zones

1) No building or impervious surface shall be constructed within 50 feet of the ordinary high water mark of a lake, pond or stream with the exception of Portage Lake. The definition of ordinary high water mark is provided in Article 1.7.

2) No building or impervious surface shall be constructed within 25 feet of the delineated boundary of a wetland as defined in Article 1.7.

3.5 Variances

The City Council and Portage Township shall have the authority to interpret this ordinance and may grant variances to these requirements provided the variances are consistent with the general purpose and intent of the requirements. In addition to these procedures, when variances are requested from the stormwater management ordinance, the applicant shall show that stormwater management systems have been provided to the maximum extent feasible within the requirements of this Ordinance.

ARTICLE 4 – ENFORCEMENT

4.1 Violations

A person who violates any provision of this ordinance is responsible for a municipal civil infraction, subject to payment of a civil fine as set forth in ______. Repeat offenses under this ordinance shall be subject to increased fines as set forth in ______.

4.2 Stop Work Order

1) **Stop work order** - Where there is work in progress that causes a violation of any provision of this ordinance, the City of Houghton/Portage Township is authorized to issue a stop work order to prevent further or continuing violations. All persons to whom the stop work order is directed, or who are involved in any way with the work or matter described in the stop work order shall fully and promptly comply with the order. The City of Houghton/Portage Township may also undertake or cause to be undertaken any necessary measures to prevent violations of this ordinance or to avoid or reduce the effects of noncompliance. The cost of any such protective measures shall be the responsibility of the owner of the property upon which the work is being done and the responsibility of any person carrying out or participating in the work, and such cost shall be a lien upon the property until paid.

2) **Emergency measures** - When emergency measures are necessary to moderate a nuisance, to protect public safety, health and welfare, or to prevent loss of life, injury or damage to property, the City of Houghton/Portage Township is authorized to carry out or arrange for all such emergency measures. Property owners shall be responsible for the cost of such measures made necessary as a result of a violation of this ordinance, and shall promptly
reimburse the City of Houghton/Portage Township for all such costs. Such costs shall be a lien upon the property until paid.

4.3 Restoration

Any violator of this ordinance may be required to restore land to its undisturbed condition and/or repair and stabilize damaged areas. In the event that restoration or repairs are not undertaken within a reasonable time after notice, the City of Houghton/Portage Township may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

ARTICLE 5 – MAINTENANCE

5.1 Responsibility

1) Responsibility - Maintenance of stormwater facilities shall be the responsibility of the person or persons holding title to the property. These persons are responsible for the continual operation, maintenance, and repair of stormwater facilities and BMPs in accordance with the provisions of this ordinance.

For privately maintained stormwater facilities, the maintenance requirements specified in this Article shall be enforced by the City of Houghton/Portage Township against the owner(s) of the property served by the stormwater facilities.

2) Maintenance plan - A maintenance plan, as specified in Article 2, shall include specific maintenance activities for each stormwater facility and any other elements of the approved stormwater management plan. The maintenance plan shall be submitted simultaneously for municipal review with all other required elements of the stormwater management plan.

3) Record keeping - Parties responsible for the operation and maintenance of stormwater facilities shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least five years. These records shall be made available to the City of Houghton/Portage Township during inspection of the facility and at other reasonable times upon request.

All stormwater facilities shall be maintained according to the measures outlined in the approved stormwater management plan. The person(s) or organization(s) responsible for maintenance shall be designated in the plan. Options include:

a. Property owner’s association provided that provisions for financing necessary maintenance are included in deed restrictions or other contractual agreements.

b. Means of permanent maintenance through agreement with the City of Houghton/Portage Township, or other appropriate governmental agency.

5.2 Access

When any new stormwater facilities are installed on private property, or when any new connection is made between private property and a public drainage control system, the
property owner shall grant to the City of Houghton/Portage Township, through an easement, the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This access includes the right to enter a property when the City of Houghton/Portage Township has reason to believe that a violation of this ordinance is occurring or has occurred, and to enter when necessary for the abatement of a public nuisance or correction of a violation of this ordinance.

5.3 Easements

1) Easements - The owner shall provide all easements necessary to implement the approved stormwater management plan and maintenance plan and to otherwise comply with this ordinance in form and substance required by the City of Houghton/Portage Township and/or any other governmental agency assuming authority, and shall record such easements as directed by the City of Houghton/Portage Township. The easements shall assure access for proper inspection and maintenance of stormwater facilities in perpetuity and shall provide adequate emergency overland flow-ways. The maintenance plan shall, among other matters, assure access for proper inspection and maintenance of stormwater facilities and adequate emergency overland flow-ways.

Easement widths will be determined by the City of Houghton/Portage Township and be situated in such a way as to allow maximum maintenance access. In general, easement widths shall conform to the following:

a. Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including but not limited to: watercourses with floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.

b. Open swales (cross lot drainage): minimum of 30 feet total width.

c. Enclosed storm drains: A minimum of 20 feet will be required, situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases for facility maintenance and repair. These may include but are not limited to, pipe depths exceeding four feet from the top of pipe, sandy soils, and steep slopes.
Appendix B
Stormwater Ordinance from the Huron Creek Watershed Management Plan
ARTICLE 1 - GENERAL

1.1 Statement of Authority

This ordinance is adopted in accordance with the Home Rule City Act, as amended, being MCL 117.1, et seq.; the Drain Code of 1956, as amended, being MCL 280.1, et seq.; the Land Division Act, as amended, being MCL 560.1, et seq.; the Revenue Bond Act, as amended, being MCL 141.101, et seq.; and the Natural Resources and Environmental Protection Act, as amended, being MCL 324.101, et seq.; Section 401(p) of the Federal Water Pollution Control Act (also known as the Clean Water Act), as amended, being 33 USC 1342(p) and 40 CFR Parts 9, 122, 123 and 124; and other applicable state and federal laws.

This ordinance shall be known and may be cited as the City of Houghton Stormwater Ordinance.

1.2 Findings

The City of Houghton finds that:

1) Water bodies, roadways, structures, and other property within the City of Houghton are at times subjected to flooding;
2) Flooding is a danger to the lives and property of the public and is also a danger to the natural resources of the City of Houghton and the region;
3) Land development alters the hydrologic response of watersheds, resulting in increased stormwater runoff rates and volumes, increased flooding, increased stream channel erosion, and increased sediment transport and deposition;
4) Stormwater runoff produced by land development contributes to increased quantities of waterborne pollutants;
5) Increases of stormwater runoff, soil erosion, and non-point source pollution have occurred as a result of land development, and cause deterioration of the water resources of the City of Houghton.
6) Increased stormwater runoff rates and volumes, and the sediments and pollutants associated with stormwater runoff from future development projects within the City of Houghton will, absent reasonable regulation and control, adversely affect the City of Houghton’s water bodies and water resources.
7) Stormwater runoff, soil erosion, and non-point source pollution can be controlled and minimized by the regulation of stormwater runoff from development;
8) Adopting the standards, criteria and procedures contained in this ordinance and implementing the same will address many of the deleterious effects of stormwater runoff;
9) Adopting these standards is necessary for the preservation of the public health, safety and welfare.

1.3 Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls to accomplish, among others, the following objectives:

1) To reduce artificially induced flood damage;
2) To minimize increased stormwater runoff rates and volumes from identified new land development;
3) To minimize the deterioration of existing watercourses, culverts and bridges, and other structures;
4) To encourage water recharge into the ground where geologically favorable conditions exist;
5) To prevent an increase in non-point source pollution;
6) To maintain the integrity of stream channels for their biological functions, as well as for drainage
and other purposes;
7) To minimize the impact of development upon streambank and streambed stability;
8) To reduce the adverse impact of changing land use on water bodies and, to that end, this
ordinance establishes minimum standards to protect water bodies from degradation resulting
from changing land use where there are insufficient stormwater management controls.

1.4 Applicability, Exemptions and General Provisions

1) This ordinance shall apply to any development site which requires approval of a plat or site
development plan, or any other permit for work which will alter stormwater drainage
characteristics of the development site, provided, however, that this ordinance shall not apply
to the following:
   a. Agricultural activity that is consistent with an approved soil conservation plan.
   b. Additions or modifications to any single family or duplex structure.
   c. Landscaping or gardening involving less than 1 acre of land.
   d. Construction of a dwelling on a legal lot within a development that itself previously received
   approval under this Article provided that less than 1 acre of land is cleared or graded for
   such construction.

1.5 Definitions

For the purpose of this Article, the following words and phrases shall have the meanings respectively
ascribed to them by this section unless the context in which they are used specifically indicates
otherwise:

1) Best Management Practices (BMPs) A practice, or combination of practices and design criteria that
comply with the Michigan Department of Environmental Quality's Guidebook of BMPs for Michigan
Watersheds, or equivalent practices and design criteria that accomplish the purposes of this Article
(including, but not limited to minimizing stormwater runoff and preventing the discharge of
pollutants into stormwater).
2) Changes in land use - Any land use change, including, but not limited to, construction, earth change,
and redevelopment.
3) Construction site stormwater runoff - Stormwater runoff from a development site following an earth
change.
4) Cut - An earth change, which lowers topography or removes soil.
5) Design storm - A precipitation event of a designated amount and/or frequency. Typically used in a
regulatory setting to designate required design criteria for stormwater facilities.
6) Detention - A system, which is designed to capture stormwater and release it over a given period of
time through an outlet structure at a controlled rate.
7) Detention basin - A designed facility which stores and detains runoff and releases water at a
controlled rate. Size will depend on the design storm event (10-, 25-, 100-year storm). These basins
may be dry between runoff events or may be "wet bottom", where a base water level occurs below
the elevation of the outlet structure.
8) Developed or development - The installation or construction of impervious surfaces on a
development site that require, pursuant to state law or local Article, the City approval of a site plan,
plat, site condominium, special land use, planned unit development, land division approval, private
road approval or other approvals required for the development of land or the erection of buildings
or structures; provided, however, that for purposes of this Article only, developed or development
shall not include the actual construction of, or an addition, extension or modification to, an
individual single-family or a two-family dwelling.
9) Discharge - The rate of flow passing a given point. Expressed as cubic feet per second.
10) Disturbed area - The surface of land from which vegetation has been removed and/or subjected to earth moving activities.
11) Drainage - The collection, conveyance, or discharge of ground water and/or surface water.
12) Drainage area - The contributing watershed, which is expressed in acres or square miles.
13) Earth change - Any human activity which removes ground cover, changes the slope or contours of the land, or exposes the soil surface to the actions of wind and rain. Earth change includes, but is not limited to, any excavating, surface grading, filling, landscaping, removal of vegetative roots, or logging.
14) Erosion - The process by which the ground surface is worn away by action of wind, water, gravity or a combination thereof.
15) Fill - Earth or other materials added to existing topography.
16) First flush - The term given to the initial runoff quantity, typically highest in pollutant concentration, which is generally believed to be in the first 1/2 inch of precipitation which washes pollutants off impermeable surfaces.
17) Grading - Any stripping, excavating, filling, and stockpiling of soil or any combination thereof and the land in its excavated or filled condition.
18) Impervious - The ground condition (e.g. roads, parking lots, sidewalks, and rooftops) which does not allow percolation or infiltration of precipitation. The condition causes water to accumulate on the surface resulting in runoff consisting of essentially 100% of precipitation.
19) Infiltration - The percolation and movement of water downward into and through the soil column. The rate of this movement is expressed in inches per hour.
20) Non-point source - "...sources of pollution which enter surface or groundwaters through widely diffused small increments," (from Federal Clean Water Act, 33 U.S. CFR Part 1344). This type of pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands and underground sources of drinking water.
21) Offsite facility - Any portion of a stormwater management system which is located off the development site which it serves.
22) 100-year flood - That water occupation adjacent to a waterbody which results from a storm event having a 1 percent probability of occurrence in any given year. Thus, a 50-year storm has a two percent probability, a ten-year storm a ten percent probability, etc.
23) Ordinary High Water Mark - The point on a streambank, lakeshore, or other waterbody shoreline to which the presence and action of surface water is so continuous as to leave a distinct mark of erosion; destruction or prevention of woody terrestrial vegetation; predominance of aquatic vegetation; or other easily recognized characteristic.
24) Peak discharge rate - The maximum rate of stormwater flow from within a drainage area expressed as cubic feet per second.
25) Point source - A discharge that is released to the surface waters of the State by a discernible, confined and discrete conveyance, including, but not limited to, a pipe, ditch, channel, tunnel, conduit, well, boat, and concentrated animal feeding facility.
26) Practicable - Available and capable of being done after taking into consideration cost, existing technology and logistics.
27) Property owner - Any person, firm or corporation having legal or equitable title to property or any person having or exercising care, custody, or control over any property.
28) Retention - A system, which is designed to capture stormwater and contain it until it infiltrates the soil or evaporates.
29) Retention basin - A stormwater management facility, either natural or manmade, which does not have an outlet, which captures and holds runoff directed into it.
30) Runoff - The portion of precipitation which does not infiltrate or percolate into the ground, but rather moves over the land, eventually reaching a waterbody, wetland, or low area.
31) Sediment - Any solid particulate matter which has been moved from the site of origin by erosion, is being transported by water, is in suspension in water, or has been deposited in a water body, wetland or floodplain.
32) Sheetflow - Overland runoff which moves relatively uniformly over the ground surface rather than being concentrated in a conveyance channel.
33) Site - Any tract, lot, or parcel of land or combination of tracts, lots, or parcels, which compose an area proposed for development and/or earth change.
34) Soil erosion control - Structures, facilities, barriers, berms, vegetative cover, basins, and/or any other installation, temporary or permanent, which are designed to minimize and prevent erosion.
35) Storm drain - A system of open or enclosed conduits and appurtenant structures intended to convey or manage stormwater runoff, ground water and drainage.
36) Stormwater facility - Structures, BMPs, areas, or related items, which are used to control, store, receive, infiltrate, or convey runoff.
37) Stormwater runoff - The runoff and drainage of precipitation resulting from rainfall, snowmelt or other natural event or process.
38) Time of concentration - The time it takes runoff to travel from the furthest portion of the watershed or drainage area to the outlet of the watershed.
39) Watershed - The total land area which contributes runoff, or is within such an area, to a common outlet, such as a lake or stream. Also known as the drainage area or catchment.
40) Wetland - Land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation and/or aquatic life. Also known as a bog, swamp, marsh, etc. (from § 324.30301 of Michigan Compiled Laws, Part 303 of NREPA, Wetlands Protection). The Michigan Department of Environmental Quality is the authority on the presence and regulatory status of wetlands.

ARTICLE 2 – STORMWATER PERMITS

2.1 Permit Required

1) A developer shall not engage in any development without first receiving a stormwater permit from the City of Houghton pursuant to Article 2.3.
2) The granting of a stormwater permit shall authorize only such development for which the permit is required, subject to the terms of the permit, and it shall not be deemed to approve other development or other land use activities.

2.2 Planning Commission Review

1) If the City of Houghton Planning Commission determines that all required information has not been received, the applicant may request that the matter be tabled, and the City of Houghton Planning Commission may, at its discretion, with or without such a request, table the matter to allow for the submittal of the required information.
2) The City of Houghton Planning Commission shall review the stormwater management plan to determine compliance with the conditions contained in Article 2.3.
3) The City of Houghton Planning Commission may add conditions for approval of the plan.
4) The authority to grant final approval for a stormwater management plan shall be vested with the Houghton City Council for all types of projects except for.

2.3 Conditions of Approval

The Houghton City Council shall grant a stormwater permit, which may impose terms and conditions in accordance with Article 2.10, and which shall be granted only upon compliance with each of the following requirements:

1) The developer has submitted a stormwater management plan complying with Article 2.4.
2) The drainage plan contains a description of adequate erosion and runoff control methods, satisfying the requirements of Article 2.7, and the developer has obtained a soil erosion permit,
if necessary.
3) The stormwater management plan conforms with all applicable design and performance standards for stormwater management systems, as set forth in Article 3.
4) All stormwater facilities are designed in accordance with the most current BMPs.
5) The developer has paid or deposited the stormwater permit review fee(s) pursuant to Article 2.6.
6) The developer has paid or posted the applicable financial guarantee pursuant to Article 2.8.
7) The developer provides all easements necessary to implement the approved drainage plan and to otherwise comply with this Ordinance including, but not limited to, Article 7.2. All easements shall be acceptable to the City of Houghton in form and substance and shall be recorded with the Houghton County Register of Deeds.
8) For commercial and industrial developments, the developer provides the required maintenance agreement for routine, emergency, and long-term maintenance of all stormwater runoff facilities and in compliance with the approved drainage plan and this Ordinance including, but not limited to, Article 7.3. The maintenance agreement shall be acceptable to the City of Houghton in form and substance and shall be recorded with the Houghton County Register of Deeds.

2.4 Stormwater Management Plan Requirements

1) General Plan Requirements:
   a. Through maps, illustrations, reports, and calculations, the stormwater management plan shall display the required information in a clear and logical sequence. The stormwater management plan shall be sufficiently detailed to specify the type, location, and size of all erosion control and stormwater facilities, including calculations.
   b. The stormwater management plan shall be drawn to a scale of at least one inch equal to 40 feet (1 inch = 40 feet) for property less than three acres and one inch equal to one hundred feet (1 inch = 100 feet) for property three acres or more in size.

2) Plan submittal requirements:
   a. The following plan requirements are in addition to other requirements specified in Articles 3.1 and 3.2. The applicant shall provide a stormwater management plan to the City for review and approval. Upon request by the applicant, or at its own initiative, the Houghton City Council may determine that one or more requirements may not be applicable and may be waived. Applicant shall submit 3 copies of the stormwater management plan, which shall identify and contain all of the following information:
      i. Contact information - The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected. Include information on the zoning classification of the applicant's parcel and all adjacent parcels.
      ii. Location map - A map depicting the location of the development site and all water bodies or municipal stormwater sewer system that will ultimately receive stormwater runoff.
      iii. Topographic base map - The existing and proposed topography of the development site, including the alignment and boundary of the natural drainage courses, with contours having a maximum interval of not greater than two feet. The map shall also show existing surface water drainage (permanent and intermittent) and flow direction, including streams, ponds, culverts, ditches, and wetlands; location of 100-year floodplain, if applicable to the site; current land use including all existing structures; locations of utilities, roads, and easements; Designated natural areas; Any proposed environmental mitigation features.
      iv. Soils information - The site soil information from the Houghton County Soil Survey Map.
      v. Watershed - A map showing the drainage boundary of the proposed development and/or earth change, and each point of discharge from the development and/or earth change.
vi. Calculations - Stormwater calculations shall be provided in accordance with the design standards referenced in Article 3.

vii. Site plan drawing - A drawing showing all proposed stormwater facilities with existing and final grades. This map shall also show existing and proposed lot lines, property lines, and structures, parking areas, etc. on the parcel and within 100 feet of the site.

viii. Outlet and culvert information - The sizes and locations of upstream and downstream culverts serving the major drainage routes flowing into and out of the development site, with arrows indicating the direction of flow to the ultimate receiving water body. Any significant offsite and onsite drainage outlet restrictions other than culverts should be noted on the drainage map. Storm sewer calculations indicating the number of acres, calculated to the nearest tenth of an acre, contributing to each specific inlet/outlet and maximum flow in cubic feet per second shall be stated on the plan. The applicant shall demonstrate that suitable conveyance exists downstream of the development site to receive the stormwater, including easements, if necessary, for such conveyance. If easements do not exist, and cannot be acquired, the applicant shall demonstrate the means of volume controls. Any areas of offsite sheet flow shall be identified.

ix. Construction plan - An implementation and sequencing plan for construction and inspection of all stormwater facilities, including a schedule of the estimated dates of completing construction of the stormwater facilities shown on the plan.

x. Sedimentation and erosion control plan - A soil erosion and sedimentation plan for all construction activities. This plan shall provide the effective control of construction site stormwater runoff and sediment tracking onto roadways.

xi. Construction specifications - All construction specifications for the stormwater facilities and a general summary on a single sheet showing all proposed stormwater facilities, including vegetative BMP’s, with drainage easements overlaid onto the overall road and utility plan and drawn to the same scale.

xii. Maintenance plan - A document in form and substance acceptable to the City for ensuring maintenance of any privately or publicly owned stormwater facilities. The maintenance plan shall include a mandatory association or other enforceable commitment to provide routine, emergency, and long-term maintenance of the facilities and, in the event that the facilities are not maintained in accordance with the approved stormwater management plan, the maintenance plan shall authorize the City to maintain any onsite stormwater facility as reasonably necessary, at the owner’s expense.

xiii. Firm contact information - Name and signature of the licensed professional engineer who has assisted in the preparation of the stormwater management plan, designed the stormwater facilities, and will inspect the final construction of the stormwater facilities. The submitted plan shall be stamped and signed by the licensed design engineer.

xiv. Vegetation plan - A drawing, which details the existing vegetation to remain and protective measures to be undertaken during construction.

xv. Other environmental permits - All other applicable environmental permits shall be acquired for the site prior to construction.

xvi. Additional Fees - Payment of applicable review fees is required before any review will commence.

xvii. Phased development plans - Should the applicant plan to subdivide or develop a given area but wishes to begin with only a portion of the total area, the original preliminary plan will include the proposed general layout for the entire area. The first phase of the subdivision will be clearly superimposed upon the overall plan in order to illustrate clearly the method of development and/or earth change that the applicant intends to follow. However, the stormwater management plan shall be submitted for the entire development, with calculations and devices designed for buildout sufficient to demonstrate to the Houghton City Council the feasibility of future phases complying with the standards of this Article.

xviii. Previously developed sites - For earth changes, development or redevelopment
occurring on a previously developed site, an applicant shall be required to include within the stormwater management plan measures for controlling existing stormwater runoff discharges from the site in accordance with the standards of Article 3, or to match existing discharge rates, whichever is less.
xix. The City has the right to do periodic inspections throughout the construction process.
xx. Acceptance by the City: Upon satisfactory final inspection the City will accept the facility, and provide a letter of acceptance.

2.5 Approved Plans and Amendments

1) Approved plans - Approval of final development plans, site plans, and final preliminary subdivision plats shall not be granted prior to approval of the stormwater management plan. Upon approval of the stormwater management plan, the Mayor, or the Mayor’s designee, shall sign two copies thereof. One signed copy shall be made a part of the City's files; and one copy shall be returned to the applicant.
   a. City Council approval shall expire one year from the date of such approval, unless construction has commenced and proceeds satisfactorily.
2) Amendments - Amendments to an approved stormwater management plan may occur only under the following circumstances:
   a. The holder of an approved plan shall notify the development official of any proposed amendment to such approved plan.
   b. Minor changes may be approved by the development official upon certification in writing to the Houghton City Council that the proposed revision does not alter the basic design nor any specified conditions of the plan as agreed upon by the Houghton City Council. The development official shall consider the following to be a minor change:
      i. Any change that does not decrease the effectiveness of approved stormwater facilities.
      ii. Any change that does not cause an increase in runoff rate and/or volume.
      iii. Any change deemed to be minor as determined by the Houghton City Council from time to time.
   c. Should the development official determine that the requested modification to the approved plan is not minor, then the applicant shall submit a new plan for review as required by this Article.

2.6 Stormwater Permit Review Fees

1) All expenses and costs incurred by the City of Houghton directly associated with processing, reviewing and approving or denying a stormwater permit application shall be paid (or reimbursed) to the City of Houghton from the funds in a separate escrow account established by the developer, as provided in Subsection 2). The City of Houghton may draw funds from a developer's escrow account to reimburse the City of Houghton for out-of-pocket expenses incurred by the City of Houghton relating to the application. Permit fee structure to be developed by City staff.

2.7 Construction Site Runoff Controls

Prior to making any earth change on a development site regulated by this ordinance, the developer shall first obtain a soil erosion permit issued in accordance with Part 91 of Act No. 451 of the Public Acts of 1994, as amended, if one is required. The developer shall install stormwater runoff facilities and shall phase the development activities so as to prevent construction site stormwater runoff and off-site sedimentation.
2.8 Financial Guarantee of Construction of Stormwater Facilities

1) The City of Houghton shall not approve a stormwater permit until the developer submits to the City of Houghton, in a form and amount satisfactory to the City of Houghton, a letter of credit or other financial guarantee for the timely and satisfactory construction of all stormwater runoff facilities and site grading in accordance with the approved drainage plan. Upon certification by a registered professional engineer that the stormwater runoff facilities have been completed in accordance with the approved stormwater management plan, the City of Houghton may release the letter of credit, or other financial guarantee subject to final City of Houghton acceptance and approval.

2) Except as provided in subsection 3, the amount of the financial guarantee shall be $__________, unless the City of Houghton determines that a greater amount is appropriate, in which case the basis for such determination shall be provided to the developer in writing. In determining whether an amount greater than $________ is appropriate, the City of Houghton shall consider the size and type of the development, the size and type of the on-site stormwater system, and the nature of the off-site stormwater runoff facilities the development will utilize.

3) This ordinance shall not be construed or interpreted as relieving a developer of its obligation to pay all costs associated with on-site private stormwater runoff facilities as well as those costs arising from the need to make other drainage improvements in order to reduce a development’s impact on a drain consistent with adopted design standards.

2.9 No Change in Approved Facilities

Stormwater runoff facilities, after construction and approval, shall be maintained in good condition, in accordance with the approved drainage plan, and shall not be subsequently altered, revised or replaced except in accordance with the approved drainage plan, or in accordance with approved amendments or revisions in the plan.

2.10 Terms and Conditions of Permits

In granting a stormwater permit, the City of Houghton may impose such terms and conditions as are reasonably necessary to effectuate the purposes of this ordinance. A developer shall comply with such terms and conditions.

ARTICLE 3 – DESIGN AND CONSTRUCTION STANDARDS

3.1 Performance and General Standards

1) Responsibility - The City is not responsible for providing drainage facilities on private property for the management of stormwater on the private property. It shall be the responsibility of the property owner to maintain private stormwater facilities serving the property and to prevent or correct the accumulation of debris, which interferes with the drainage or stormwater management function of the system.

All developments and earth changes subject to review under the requirements of this Article shall be designed, constructed, and maintained to control runoff, prevent flooding and protect water quality. The particular facilities and measures required onsite shall reflect the natural features, wetland, and watercourses on the site; the potential for onsite and offsite flooding, water pollution, and erosion; and the size of the site.

2) General standards for onsite and offsite stormwater management.
   a. Stormwater facilities shall be designed to prevent flood hazards and water pollution related to stormwater runoff, soil erosion and channel erosion from the proposed earth change.
b. Existing stormwater from upstream and offsite locations shall be conveyed around or through the site, or stored onsite.
c. Every stormwater facility shall control the release of stormwater in accordance with the
design standards listed in this Article.
d. Unless otherwise approved, stormwater runoff shall be conveyed through swales and
vegetated buffer strips so as to decrease runoff velocity, allow for natural infiltration and
passive storage, allow suspended sediment particles to settle, and to remove pollutants.
e. Alterations to natural drainage patterns shall not increase the rate of runoff, create flooding
or water pollution for adjacent or downstream property owners.
f. Cutting, filling, and grading shall be minimized and the natural topography of the site shall
be preserved to the maximum extent practicable, except where specific findings
demonstrate that major alterations will still meet the purposes and requirements of this
Article.
g. Grading of lands at locations that are adjacent to or near public or private property shall be
done in a manner to protect the property from settling, cracking or sustaining other
damage.
h. All development and other earth changes shall be designed, constructed, and completed so
that the exposed area of any disturbed land is limited to the shortest possible period of
time.

3) Stormwater facilities - The types of stormwater facilities are listed in order of preference, with
the most desirable listed first. Stormwater storage and/or infiltration facilities, which protect
water quality and minimize flooding, shall be designed to meet the standards of this Article.
Storage facilities may include, but are not limited to, detention basins, retention basins,
infiltration trenches, swales with check dams, bioretention structures and other facilities and/or
BMP's proposed by the applicant. It shall be the responsibility of the applicant to demonstrate
that all proposed facilities meet the intent, goals, and standards of this Article.

a. Infiltration facilities - This Article encourages the use of infiltration systems as a part of
stormwater management plan design. The following areas and conditions are considered
inappropriate for use of stormwater infiltration:

i. Fueling and vehicle maintenance areas.

ii. Areas with less than 3 feet separation distance from the bottom of the infiltration
system to the elevation of seasonal high groundwater or the top of bedrock.

iii. Areas with runoff from industrial, commercial and institutional parking lots and roads
with less than 5 feet separation distance from the bottom of the infiltration system to
the elevation of seasonal high groundwater or the top of bedrock.

iv. Areas within 400 feet of a community water system well or within 100 feet of a
private
well.

v. Any area where the soil between the bottom of the infiltration system and seasonal
high groundwater or the top of bedrock is a clean sand (consisting of less than 10% fines).

Stormwater management plan designers shall consider the above criteria including soil
permeability when designing stormwater infiltration components of a management system.
The site developer shall attempt to minimize compaction of soil, which decreases infiltration
and groundwater recharge and contributes to increased stormwater runoff.

b. Stormwater storage facilities - All detention and/or retention basins shall be designed to
meet the standards of this Article. The types of basins are listed in order of preference, with
the most desirable listed first:

i. Wet basins or detention basins with a fixed minimum water elevation between runoff
events. Wet basins, which serve to trap soil particles onsite, are preferable to dry basins.

ii. Detention basins, which detain the “first flush” (first ½-inch of precipitation) of an
event
and attenuate its release over an extended period.

iii. Extended detention basins, which hold stormwater from a less frequent storm event
3.2 Design and Performance Standards

1) Rate of Peak Discharge – By design, stormwater facilities shall be employed to maintain or reduce the peak runoff discharge rate following the same rainfall, to the maximum extent practicable, as compared to pre-development conditions applicable to the post-construction site.

2) Volume of Total Discharge – Where infiltration facilities are appropriate for use according to Article 3.1(3)a, the post-development total runoff volume shall approximate the predevelopment total runoff volume following the same rainfall, to the maximum extent practicable, as compared to pre-development conditions applicable to the post-construction site. Where infiltration facilities are not appropriate for use according to this Article, the increased volume of water discharged due to earth changes and/or development of the site shall not create adverse impacts to property owners and watercourses. These adverse impacts may include, but are not limited to flooding, excessive soil saturation, crop damage, erosion, and/or degradation in water quality or habitat.

3) Detention and Retention Basin Design - Detention and/or retention basins shall be designed to hold runoff from the largest-sized 24-hour storm event practicable. Basins shall be permanently stabilized to minimize erosion. Detention and/or retention basins shall have an overflow system. Detention and/or retention basins and associated berms and landscaping shall be designed to protect public safety and to be visually attractive. Detention and/or retention basins shall be provided in platted outlots, common areas or open space areas.

4) Design Storm Events - The following rainfall totals shall be used when completing runoff calculations for locations within the City of Houghton:
   a. 2-year, 24-hour Storm = 2.4 inches.
   b. 25-year, 24-hour Storm = 3.75 inches.
   c. 100-year, 24-hour Storm = 4.75 inches.

5) Runoff Calculations:
   a. Methods - All stormwater runoff calculations shall be completed using the Soil Conservation Service (SCS) TR-20 methodology, or equivalent methodology. Output from models that utilize TR-20 or equivalent methodologies is also acceptable.
   b. Submittals – To demonstrate compliance with performance standards indicated in Articles 3.2(2) and 3.2(3) above, calculations must be supplied for, at a minimum, the three storm events listed in 3.2(4).

3.3 Landscaping and Vegetation

1) An applicant shall address the following guiding principles and standards:
   a. Native, natural existing vegetation shall be retained to the maximum extent practicable. Species chosen for site vegetation shall be reviewed to ensure they have not been identified as invasive.
   b. Native species shall be used for re-vegetation and landscaping to the maximum extent practicable.
   c. The flood tolerance of proposed species shall be considered, particularly in stormwater management areas and components.
   d. Water requirements of species proposed in areas other than stormwater management facilities shall be considered, with the goal of reducing their water demand and nutrient requirements to the maximum extent practicable.
   e. The stormwater management components shall be chemical-free zones within the development, with the exception of accepted management techniques for the establishment and maintenance of components associated with biotechnical stormwater
3.4 Buffer Zones

1) No building or impervious surface shall be constructed within 50 feet of the ordinary high water mark of a lake, pond or stream with the exception of Portage Lake. The definition of ordinary high water mark is as presented in Article 1.5.
2) No building or impervious surface shall be constructed within 50 feet of the delineated boundary of a wetland as defined in Article 1.5.

3.5 Variances

The City Council shall have the authority to interpret this Article and may grant variances to these requirements provided the variances are consistent with the general purpose and intent of the requirements. In addition to these procedures, when variances are requested from the stormwater management system Article, the applicant shall show that stormwater management systems have been provided to the maximum extent feasible with the requirements of this Article.

ARTICLE 4 – ENFORCEMENT

4.1 Violations

A person who violates any provision of this Article is responsible for a municipal civil infraction, subject to payment of a civil fine as set forth in section 42-38 of the Code. Repeat offenses under this Article shall be subject to increased fines as set forth in section 42-38 of the Code.

4.2 Stop Work Order

1) Stop work order - Where there is work in progress that causes a violation of any provision of this Article, the City is authorized to issue a stop work order to prevent further or continuing violations. All persons to whom the stop work order is directed, or who are involved in any way with the work or matter described in the stop work order shall fully and promptly comply with the order. The City may also undertake or cause to be undertaken any necessary measures to prevent violations of this Article or to avoid or reduce the effects of noncompliance. The cost of any such protective measures shall be the responsibility of the owner of the property upon which the work is being done and the responsibility of any person carrying out or participating in the work, and such cost shall be a lien upon the property until paid.
2) Emergency measures. When emergency measures are necessary to moderate a nuisance, to protect public safety, health and welfare, or to prevent loss of life, injury or damage to property, the City is authorized to carry out or arrange for all such emergency measures. Property owners shall be responsible for the cost of such measures made necessary as a result of a violation of this Article, and shall promptly reimburse the City for all of such costs. Such costs shall be a lien upon the property until paid.

4.3 Restoration

Any violator of this Article may be required to restore land to its undisturbed condition and/or repair and stabilize damaged areas. In the event that restoration or repairs are not undertaken within a
reasonable time after notice, the City may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

ARTICLE 5 – MAINTENANCE

5.1 Responsibility

1) Responsibility - Maintenance of stormwater facilities shall be the responsibility of the person or persons holding title to the property. These persons are responsible for the continual operation, maintenance, and repair of stormwater facilities and BMPs in accordance with the provisions of this Article.

For privately maintained stormwater facilities, the maintenance requirements specified in this Article shall be enforced by the City against the owner(s) of the property served by the stormwater facilities.

2) Maintenance plan - A maintenance plan, as specified in Article 2, shall include specific maintenance activities for each stormwater facility and any other elements of the approved stormwater management plan. The maintenance plan shall be submitted simultaneously for municipal review with all other required elements of the stormwater management plan.

3) Record keeping - Parties responsible for the operation and maintenance of stormwater facilities shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least five years. These records shall be made available to the City during inspection of the facility and at other reasonable times upon request.

All stormwater facilities shall be maintained according to the measures outlined in the approved stormwater management plan. The person(s) or organization(s) responsible for maintenance shall be designated in the plan. Options include:

a. Property owner's association provided that provisions for financing necessary maintenance are included in deed restrictions or other contractual agreements.

b. Means of permanent maintenance through agreement with the City of Houghton, or other appropriate governmental agency.

5.2 Access

When any new stormwater facilities are installed on private property, or when any new connection is made between private property and a public drainage control system, the property owner shall grant to the City through an easement the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This access includes the right to enter a property when the City has reason to believe that a violation of this Article is occurring or has occurred, and to enter when necessary for the abatement of a public nuisance or correction of a violation of this Article.

5.3 Easements

1) Easements - The owner shall provide all easements necessary to implement the approved stormwater management plan and maintenance plan and to otherwise comply with this Article in form and substance required by the City and/or any other governmental agency assuming authority, and shall record such easements as directed by the City. The easements shall assure access for proper inspection and maintenance of stormwater facilities in perpetuity and shall provide adequate emergency overland flow-ways. The maintenance plan shall, among other matters, assure access for proper inspection and maintenance of stormwater facilities and adequate emergency overland flow-ways.
Easement widths will be determined by the City and be situated in such a way as to allow maximum maintenance access. In general, easement widths shall conform to the following:

a. Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including but not limited to: watercourses with floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.

b. Open swales (cross lot drainage): minimum of 30 feet total width.

c. Enclosed storm drains: A minimum of 20 feet will be required, situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases for facility maintenance and repair. These may include but are not limited to, pipe depths exceeding four feet from the top of pipe, sandy soils, and steep slopes.
Appendix C
Meeting Agendas and Minutes

C-1. Agenda February 10, 2011
C-2. Minutes February 10, 2011
C-3. Agenda February 15, 2011
C-4. Minutes February 15, 2011
C-5. Agenda February 22, 2011
C-6. Minutes February 22, 2011
C-7. Agenda March 1, 2011
C-8. Minutes March 1, 2011
C-9. Agenda March 8, 2011
C-10. Minutes March 8, 2011
C-11. Agenda March 15, 2011
C-12. Minutes March 15, 2011
C-14. Minutes March 22, 2011
C-15. Agenda March 29, 2011
C-16. Minutes March 29, 2011
C-17. Agenda April 5, 2011
C-18. Minutes April 5, 2011
C-19. Agenda April 12, 2011
C-20. Minutes April 12, 2011
C-21. Agenda April 19, 2011
C-22. Minutes April 19, 2011

Meetings were held between 9am – noon from February 15 through April 19, 2011. The working group members invested countless hours above and beyond the time required for meetings, researching the issues and available resources to develop the proposed ordinance.
Stormwater Ordinance Development Planning Meeting

February 10, 2011
City Center
Houghton, Michigan

Participants and affiliation:
Scott MacInnes, City Manager, City of Houghton
Bruce Petersen, Supervisor, Portage Township
Jay Green, Planning Commission, City of Houghton
John Pekkala, Drain Inspector, Houghton County
Mark Zenner, Director of Public Works, City of Houghton
Mitch Koetje, MDNRE
Alex Mayer, Center for Water and Society, Michigan Tech
Hugh Gorman, Center for Water and Society, Michigan Tech
Tristan Beaster, Michigan Tech (SSTEM scholar)
Seth Johnson, Michigan Tech (SSTEM scholar)
Meral Jackson, Michigan Tech (SSTEM scholar)

Agenda

1. Introductions
2. Stormwater Ordinances
   a. General concepts
   b. Components
   c. Critical decisions
3. Plan of Action, Goals and Deadlines
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Meeting Notes  
February 10, 2011  

The first meeting to develop a stormwater ordinance for the City of Houghton and Portage Township was held at 3 pm at the Houghton City Center.  

**Attendees:** Scott MacInnes, Bruce Petersen, Jay Green, John Pekkala, Alex Mayer, Hugh Gorman, Tristan Beaster, Seth Johnson, Meral Jackson, Mitch Koetje (via conference call)  

**Introduction**  
Attendees were introduced, and Tristan, Seth and Meral presented a short introduction to stormwater ordinances.  

**Discussion Points**  
Both jurisdictions would like to have the same wording within their ordinances for consistency across watersheds. The group discussed how to break down tasks by having a technical team or working group meet weekly, then bring any items for discussion to the greater group on an “as needed” basis.  

The timeframe for the student’s participation is to have a draft ordinance ready to present to the planning commissions by April 22. This provides 10 weeks to work on the current draft.  

Mitch suggested students research water quality data to help identify the design storm to which the ordinance will be written. Jay suggested the Center for Watershed Protection in the Portland/Seattle, OR area as a helpful tool. Discussion on what design storm to specify included first flush, water quality and volume. The Superior Watershed partnership in Marquette might provide some pertinent information on storm events in this region. The process for evaluating applications was touched on with no resolution. Potential zoning within the watershed was suggested to address quality vs. quantity at differing points along the watershed, delivery rates to stream.  

It was decided the working group would discuss design storm issues and bring back to the larger group. Meral would request a watershed analysis on Huron Creek and the Pilgrim River. The working group would meet weekly through the final deadline of April 22 and bring items to the larger group on an as-needed basis.  

The first working group meeting would be held in Dow 804 on the Michigan Tech campus.
Hello Stakeholders,

Thank you for taking time to meet with everyone yesterday to begin working on the stormwater ordinance. The breakout "Working Group" meetings will be held Tuesday mornings 9am on campus in Dow 804. I will try to send out the meeting agendas well ahead of time so that anyone who is interested in that week’s topic can plan to attend.

Agenda for Tuesday 2/15 Stormwater Ordinance (SWO) Working Group meeting:

1. Compare draft ordinance with other comparable ordinances (content, length)
2. Review current draft ordinance
   a. Identify sections that need work
   b. Prioritize targeted sections
   c. Assign deadlines for each section within the larger time frame

The website Mitch mentioned yesterday as another resource can be found at:
http://www.semcog.org/Stormwater.aspx

Attached is the current draft ordinance (from the Huron Creek Management Plan) and the model ordinance provided by stormwatercenter.net with suggestions for groups developing SWO’s.

Meral
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Working Group Meeting Notes  
Feb 15, 2011

The first meeting of the working group to develop technical sections of the ordinance.

**Attendees:** Bruce Petersen, Jay Green, Seth Johnson, Tristan Beaster, Meral Jackson

**Discussion points:** It was agreed to modify the existing draft ordinance from the Huron Creek Watershed Management Plan rather than use the model ordinance or another ordinance. The model ordinance contained several sections not applicable to a small area such as the city and township.

The topic of water quality versus quantity (volume) was defined and refined. Although John had previously asked to include wording on downstream volume remaining constant, the way to address this is by infiltration or evaporation which may not be feasible here. Item is still to be resolved.

Discussion of how to word ordinance current work forward or retroactive was not resolved.

Water quality versus quantity and design storm decisions or recommendations was tabled till next meeting.

Article 2, stormwater permits, was referred to Scott for review as there may be sections which overlap with existing ordinances.

Tasks for week 2 meeting: Recurrence interval for design storm. Focus on Article 3, the technical section of the ordinance. Prioritize tasks but deadlines were not identified:

1. Article 3: Stormwater Ordinance Working Group (SWOWG) priority, to comb through and adjust wording as needed  
2. Article 2: Stormwater permits, need Scott’s input, second priority (if time allows by 4/22)  
3. Articles 4 and 5: time permitting, work on before April 22 however this is best written by commissioners.

Homework: Meral – request watershed analysis on Huron, Pilgrim. Tristan- evaluate first flush criteria.
Hello Stakeholders,

The SWO Working Group prioritized the following tasks to work toward the final ordinance:

1. Article 3: Design & Construction Standards
2. Article 2: Stormwater Permits
3. Articles 4 & 5: Enforcement & Maintenance
4. Article 1: General Information

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will focus on developing article 3 by April 22, 2011 and address the remaining sections as time allows. The content of articles 1, 2, 4 and 5 will require administrative input and may include the planning commissions.

Agenda for Tuesday 2/22 Stormwater Ordinance (SWO) Working Group meeting:

1. Identify sections of article 3 that require rewriting, modification or omission
2. Compare draft with comparable ordinances for assistance in reworking current draft
3. Identify sections that require input from City, Township (i.e., target storm event)
4. Target deadline for tasks within article 3 development

Meral
City of Houghton  
Portage Township  
Stormwater Ordinance Development

Meeting Notes  
February 22, 2011  
Dow 804

Attendees:  
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: Article 3 of the ordinance (Design & Construction Standards) will remain the focus of the working group. Other sections will be addressed as time allows.

Discussion on previous stormwater damage illustrated the need for a local ordinance, to prevent stormwater damage such as the “Shopkovich” problem or Hancock’s Birch Grove disaster. Therefore, the ordinance should address new development as well as re-development, so that modifications to existing development triggers ordinance implementation. Also, predevelopment conditions as pre-existing conditions is not acceptable, the ordinance would need to specify something akin to presettlement conditions. The ordinance should not be retroactive for current structures else we run the risk of alienating current owners/developers. Single family homes are built by small, local builders, all other construction typically consists of larger contractors.

Watershed hydrographs would be helpful to target design storm events; Meral will request flood discharge analyses from MDEQ for Huron Creek and Pilgrim River. A C-factor (runoff factor) may have to be specified when using a TR-25 or TR-55 to determine predevelopment (presettlement) flow conditions. Also, flow rates should be considered (per John Pekkala’s recommendation) rather than volume.

Several stormwater ordinances were presented to compare and contrast with the draft WMP ordinance to assist in identifying redundencies and key components. However, other ordinances provided no design guidelines for stormwater management.

Stormwater and flood prevention resources all stated the critical need to identify reference manuals for BMPs, to assist in identifying appropriate designs for remediating stormwater problems. The DEQ BMP and SEMCOG LID manuals are acceptable to the working group.

The question was raised if plans need to be submitted by a licensed engineer, to be discussed at a later date. Also, Marquette’s setup having all developments pay a fee to the city to manage all stormwater facilities is convenient, but not practical for this area.

Tasks for next meeting: Obtain Seattle, OR manual, and explore any additional design manuals as potential acceptable references.
Hello Stakeholders,

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will review comparable ordinances and BMP manuals and compare to the current wording in sections of article 3 that we identified last week as 'needing work'.

Agenda for Tuesday 3/1 Stormwater Ordinance (SWO) Working Group meeting:

1. Target bullet points within Article 3 which need rewording or omitting
2. Review MDEQ BMP Manual
3. Review ordinances and manuals from other jurisdictions to identify alternate options

One of the manuals which we will be evaluating is the Low Impact Development Manual for Michigan by SEMCOG, which can be downloaded at: http://library.semcog.org/InmagicGenie/DocumentFolder/LIDManualWeb.pdf

The MDEQ BMP Manual can be found at: http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3714-118554--,00.html

Meral
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Meeting Notes  
March 1, 2011  
Dow 804  

Attendees:  
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson  

Discussion Points: Seattle’s ordinance emphasizes infiltration over detention/retention, which might apply to some township areas but is not often appropriate within the city. The Grand Traverse ordinance is very short, and warrants further evaluation as Scott MacInnes stated his preference for a condensed ordinance (rather than a lengthy one). Jay wants to focus on extended detention versus standard detention as it offers some water quality improvement, which will require choosing a design storm event target for design standards.

Jay suggested as potential resources/design manuals: Center for Watershed Protection; Vermont’s Manual (260 p., Vol. 1 – Design Manual, Vol. 2 – Regulations); Boise Design Manual (135 p.); Denver Metro Drainage/Flood (primarily addresses flooding); Isabella county, MI (a metropolitan area surrounded by rural, similar to our locale). All sample design manuals and ordinances should be circulated to everyone for reference. The WI manual was deemed too lengthy to use as a resource, and focuses on constructions BMPs.

Discussion reiterated the focus on article, leaving permitting, enforcement and maintenance to the planning commissions.

TR-25 versus TR-55: smaller watershed utilize TR-55 while large areas rely on a TR-25 assessment. Hydrocad will take either as a parameter.

Tasks for next meeting: Meral – burn CD of all manuals and sample ordinances for each person. All – review Grand Traverse and SEMCOG LID manuals, be ready to discuss in detail possibility of merging parts with current ordinance draft.
City of Houghton
Portage Township
Stormwater Ordinance Development

Working Group Agenda
March 8, 2011

No agenda circulated
Continue reviewing alternate BMP manuals

Meral
City of Houghton  
Portage Township  
Stormwater Ordinance Development

Meeting Notes  
March 8, 2011  
Dow 804

Attendees:  
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: Detention pond specifications from the SEMCOG LID and MDEQ BMP manuals were compared to determine suitability as our reference manuals. The Grand Traverse combined manual/ordinance includes a section on soil erosion, whereas the LID manual indirectly refers to erosion control; this may be worth incorporating into our design specs section tailored to the city and township issues unique to this region.

Content brevity was emphasized to address Scott’s preference for an ordinance as short as possible, to facilitate dissemination to developers directly affected by adoption of the ordinance. Therefore, we need to identify the goal of this ordinance, to assist in drafting an ordinance which specifically details focus of BMPs (quality versus quantity issues). The target design storm will be a critical component of our ordinance, and should be identified early in the ordinance development process.

Tasks for next meeting: Each attendee needs to familiarize themselves with the Grand Traverse ordinance/manual and the draft ordinance to determine how to make our ordinance as short as possible yet thorough. Bring to the next meeting specific points of each ordinance that should be examined further, and identify sections which are redundant or unnecessary. Identify BMP guidelines which will need to be references in the city/township ordinance.
Hello Stakeholders,

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will be closely evaluating the current draft ordinance and the Grand Traverse County ordinance.

Agenda for Tuesday 3/15 Stormwater Ordinance (SWO) Working Group meeting:

1. Evaluate current draft ordinance and identify sections needing rewording
2. Compare with Grand Traverse County SWO for alternate wording/phrasing
3. Suggestions for other ordinances with preferential sections as additional alternatives.

Michigan BMP Guidebook which Jay targeted for reference can be found at: http://www.michigan.gov/documents/deq/lwm-smg-all_202833_7.pdf

The full Grand Traverse County SWO can be downloaded at: http://www.co.grand-traverse.mi.us/departments/drain_commissioner/Storm_Water_Control_Ordinance_and_Design_Standards_for_all_Municipalities_of_Grand_Traverse_County_except_Traverse_City_Blair_and_Green_Lake_Townships.htm

Please let me know if you have any problems downloading the aforementioned documents and I will send the PDF to you directly.

Meral
Meeting Notes
March 15, 2011
Dow 804

Attendees:
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: It was noted the Grand Traverse ordinance appendix (their BMP manual) focuses primarily on flooding, not water quality. For extended detention basins, which address some quality measures in addition to quantity control, the ordinance will need to specify the maximum allowable discharge. Likewise, the second criteria is a targeted stormwater event. The ordinance should address two different discharge levels, e.g., for a 1.5 year storm event, an extended detention discharge rate as well as a standard detention discharge rate must be provided.

A Type II rainfall event is the best target to use for this region. The Grand Traverse appendix specifies a range of rainfall types, and as such is not specific enough for our goal of stormwater control.

After some discussion, it was decided that other than targeting a few well-written components in the Grand Traverse ordinance (or, for that matter, any other ordinance), we would just modify the existing Huron Creek sample ordinance rather than hybridize with Grand Traverse or another ordinance.
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Working Group Agenda  
March 22, 2011  

Hello Stakeholders,  

The breakout "Working Group" meeting will be held **Tuesday** morning 9am on campus in Dow 804. We will continue to modify the draft ordinance from the Huron Creek Management Plan.  

Agenda for **Tuesday 3/22** Stormwater Ordinance (SWO) Working Group meeting:  

1. Continue modifying existing wording to reflect local issues and concerns  
2. Discuss alternate ordinance wording for sections that need complete revising  
3. Identify design storm event for target criteria  

Attached are the current revisions to date.  

Meral  
Enclosure: filename (Huron Creek ordinance 3-15-2011.docx)
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Meeting Notes  
March 22, 2011  
Dow 804  

Attendees:  
Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson  

Discussion Points: Mitch Koetje and Bruce Petersen (absent) provided written recommendations via email of the current draft ordinance. The primary focus of the meeting revolved around section 1.5, definitions, and article 3 content.  

A large part of the discussion revolved around wording of the ordinance section specifically addressing inflow from upstream and other offsite runoff entering the parcel in question. Bruce recommended wording to convey existing offsite flows through or around the parcel, or adding wording to account for incoming flow within BMP calculations for that site. The issue was tabled for a later meeting.  

Discussion pertaining to disturbed land addressed the question whether some part of the issue was covered by the City’s current landscaping ordinance. The landscaping ordinance addressed planting within a set timeperiod to prevent erosion. Jay suggested having Scott review other ordinances for overlap, to identify sections which could then be eliminated due to redundancy.  

A discussion of BMP methods to address stormwater targeted infiltration as the most desireable issue to target in BMP selection, followed by extended detention then standard detention.  

Tasks for next meeting: research definitions and descriptions for wetlands, development, and earth change; provide suggestions for incorporating design manual specifications into existing ordinance.
Hello Stakeholders,

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will continue to modify the draft ordinance from the Huron Creek Management Plan.

Agenda for Tuesday 3/29 Stormwater Ordinance (SWO) Working Group meeting:

1. Review progress to date on definitions, Article 3, section 3.1
2. Begin revision of Article 3, section 3.2: Design and Performance Standards

Attached are the current revisions to date. We are still working on a few key definitions ("development", "earth change" & logging, "property owner" vs. easement holder, "wetland") and have yet to finish Article 3, Section 3.1 points 2) b, e, g and h.

Meral
Enclosure: filename (Huron Creek ordinance 3-22-2011.docx)
City of Houghton
Portage Township
Stormwater Ordinance Development

Meeting Notes
March 29, 2011
Dow 804

Attendees:
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: Wording on specific topics was manipulated in section 1.4, exemptions and general provisions (silvicultural/agricultural practies, duplex/single family structures on previously developed lots or lots less than 1 acre). Wetlands were added as a separate section, section 1.5, in order to emphasize the importance of additional permitting required by state and federal entities when building on or near a wetland. Additional rewording was completed within the definition sections (now 1.6), and some phrasing was changed in Permitting, sections 2.1 and 2.3.

Tasks for next meeting: continue work on article 3, design and construction standards.
Hello Stakeholders,

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will continue to modify the draft ordinance from the Huron Creek Management Plan.

Agenda for Tuesday 4/5 Stormwater Ordinance (SWO) Working Group meeting:

1. Review progress to date
2. Continue revision of Article 3, section 3.2, subsection 2) b : Design and Performance Standards

Attached are the current revisions to date.

Meral
Enclosure: filename (Huron Creek ordinance 3-29-2011.docx)
City of Houghton  
Portage Township  
Stormwater Ordinance Development  

Meeting Notes  
April 5, 2011  
Dow 804  

Attendees:  
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson  

Discussion Points: Attendees agreed upon the importance of addressing first flush water quality issues, since the first flush contains the majority of pollutants in stormwater runoff. Methods to address first flush were identified and discussed (bioretention, retention ponds, extended detention basins). Sizing and cost of basins were estimated using the Copper Country Mall inflow to Shopping Cart Creek to illustrate the cost burden of implementing first flush requirements. Jay insisted forebays be a requirement of all basins in order to trap sediment loads. It was suggested that conveying roof runoff (clean water) directly to waterways should be a recommendation to reduce basin size requirements. Also, multistage outlets for basins would need to be stated as a preferential technique versus single stage outlets. It was agreed to target the 2-, 25-, 50-, and 100-year design storms as standards for which basins should be designed to accommodate.  

The responsibility section (3.1(1)) was revised to reflect the nature of the city and township's organizational structure.  

Tasks for next meeting: finish revising article 3 as the final deadline approaches.
Hello Stakeholders,

The breakout "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804. We will finish modifying Article 3: Design and Performance Standards from the draft ordinance.

Only two working group meetings are left to finish revising the standards with SSTEM scholars during spring semester.

Agenda for Tuesday 4/12 Stormwater Ordinance (SWO) Working Group meeting:

Goal: Finish revising Article 3: Design and Construction Standards for referral to the respective Planning Commissions

1. Finalize wording on targeted topics
2. Address any standard and specification issues that may need external review

Attached are the current revisions to date.

Meral
Enclosure: filename (Huron Creek ordinance 4-5-2011.docx)
City of Houghton
Portage Township
Stormwater Ordinance Development

Meeting Notes
April 12, 2011
Dow 804

Attendees:
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: Article 3 revisions were completed, with a few minor points left to address at the final working group meeting on April 19, 2011.

Tasks for next meeting: Meral - the final version of the ordinance will be reviewed by staff at Michigan Tech’s Writing Center for grammar and punctuation.
City of Houghton  
Portage Township  
Stormwater Ordinance Development

Working Group Agenda  
April 19, 2011

Hello Stakeholders,

The final "Working Group" meeting will be held Tuesday morning 9am on campus in Dow 804.

Agenda for Tuesday 4/19 Stormwater Ordinance (SWO) Working Group meeting:

Goal: Approve final draft of Article 3: Design and Construction Standards, in preparation for permitting, enforcement, and maintenance revisions by the respective Planning Commissions.

1. Evaluate final wording of Article 3  
2. Prepare recommendations for Planning Commissions on remaining articles.

Attached is the ‘final draft’ version of the ordinance. I have worked with Michigan Tech’s Writing Center on Article 3’s grammar and writing style.

Meral  
Enclosure: filename (Huron Creek ordinance Final Draft 4-15-2011.docx)
City of Houghton
Portage Township
Stormwater Ordinance Development

Meeting Notes
April 19, 2011
Dow 804

Attendees:
Bruce Petersen, Jay Green, Tristan Beaster, Seth Johnson, Meral Jackson

Discussion Points: Article 3, design and construction standards, was finalized and in the remaining time, all the remaining sections were reviewed as far as the working group could revise them without planning commission input. A few key items that need to be addressed by the planning commissions were highlighted to call to attention.

Tasks for presenting final ordinance to planning commissions: Meral – review entire ordinance with Michigan Tech Writing Center staff for correct grammar and punctuation.

Thank you everyone for a productive and rewarding project!