

Appendix E
Storm Water Standards

Lower Rum River Watershed Management Organization

Stormwater Standards

Date of Adoption by LRRWMO

March 15, 2018

Effective Date

March 15, 2018

Background

Stormwater is an all-inclusive term that refers to any of the water running off the land's surface after a rainfall or snowmelt event. Prior to development, stormwater is a small component of the annual water balance. However, as development increases, the paving and compaction of pervious surfaces increase stormwater runoff. It is important to manage this water because of the impacts it can have on water quality, flooding, and groundwater recharge. The LRRWMO has goals of improving or maintaining water quality, preventing future flooding problems, and encouraging groundwater recharge. Therefore, the Lower Rum River WMO has minimum stormwater standards.

These standards were developed by a Technical Advisory Committee including representation from each LRRWMO community, MN Department of Natural Resources, MN Pollution Control Agency, MN Board of Water and Soil Resources, Metropolitan Council, US Army Corps of Engineers, MN Department of Transportation, Anoka Conservation District, Anoka County Environmental Services, and the Builder's Association of the Twin Cities.

Administration

These stormwater standards will be administered by both the LRRWMO and member cities. The LRRWMO will apply these standards to their permitting program. Each city must adopt standards at least as protective as the LRRWMO standards in their local water plan and/or ordinances, and implement them.

Applicability

LRRWMO Stormwater Standards apply to:

Projects that disturb/alter one acre or more, or are part of a common plan of development or sale that disturbs/alters one acre or more.

Definitions:

A common plan of development or sale is defined as a contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. One plan is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land disturbing activities may occur.

Land disturbance is defined as activity that results in a change or alteration in the existing ground cover (both pervious and non-pervious) and/or the existing soil topography. Land disturbing activities include, but are not limited to, development, redevelopment, construction, reconstruction, clearing, grading, filling, stockpiling, excavation, and borrow pits. Road milling/overlay, demolition, and routine vegetation management activities will not be considered land disturbance.

The following are exempt:

- Road reconstruction that does not increase impervious area by more than one acre or alter drainage patterns (example: mill and overlay). Altering drainage patterns is defined as changing the ultimate discharge point of the water.
- Utility construction/reconstruction within road right-of-way.
- Agricultural operations >300 feet from the Rum River and not creating additional impervious surfaces.
- Gardens.
- Pole setting.
- Emergency activities immediately necessary for the protection of life, property, or natural resources.
- Whenever the LRRWMO Board determines:
 - The proposed project is not likely to impair attainment of the purpose and intent of these standards.
 - Off-site stormwater treatment is provided by an existing facility, achieving a level of control that is at least equal to the on-site requirements.

Permit Application Materials

Any project to which these standards are applicable must submit a completed LRRWMO permit application and all materials requested within that application. Permits from other entities, such as the city, US Army Corps of Engineers, MN DNR, MN Pollution Control Agency, or others may also be necessary.

Permit Process and Reviews

Projects must obtain approvals/permits from both the LRRWMO and the city. The LRRWMO permit application must be submitted to the LRRWMO, not the city. LRRWMO permit materials are available on the LRRWMO website. Questions can be directed to the LRRWMO representative or city staff liaison to the LRRWMO for the city where the project will occur. These contacts are listed on the website with the permitting materials. The city and LRRWMO will coordinate their permit reviews; duplication in the review process will be minimized by a review checklist that all reviewers use.

Permit Lifespan

Permits have a fixed lifespan of two years from the date of issuance. During this lifespan the requirements of the permit shall be fixed, and the project will not be subject to new LRRWMO stormwater standards enacted since the issuance of the original permit.

Permit Extensions

Extensions to LRRWMO permits may be granted. When an extension is granted, the LRRWMO stormwater standards in effect at the time of the original permit issuance shall continue to apply. The procedure for extensions varies for platted and non-platted projects as follows:

For platted projects, LRRWMO permit extensions shall automatically follow extensions granted by the City for that same project. The applicant is responsible for notifying the LRRWMO in writing if such an extension is granted by the city.

In cases where a project must reapply to the City for a preliminary plat, either because of expiration of the original permit or changes to the project, the permittee must also reapply for a LRRWMO permit and will be subject to any new LRRWMO stormwater standards enacted since the issuance of the original permit.

For non-platted projects, the applicant must apply to the LRRWMO for a permit extension before the end the two year permit life. Such requests will be considered by the LRRWMO Board on a case-by-case basis, and will only be granted if the proposed project has not changed since the issuance of the original permit.

Satisfaction of Permit

The LRRWMO stormwater treatment permit requirements shall be deemed satisfied when stormwater infrastructure has been built to meet LRRWMO permit requirements and required performance has been verified (other permit aspects, such as erosion control, may remain outstanding). Activities or construction consistent with the original permitted project plan occurring at a later date do not require a new LRRWMO permit nor are they subject to new LRRWMO stormwater treatment standards that may have been enacted since the issuance of the original permit.

The following example serves to clarify how this provision would apply to a phased common plan of development. Consider an example where a common plan of development will be built in several phases, including grading, stormwater infrastructure, and several phases of building construction. A LRRWMO permit must be secured for the multi-phase common plan of development. Once stormwater infrastructure is constructed and found to be performing to the standards required by the permit, the stormwater standards for all phases of the common plan of development will be considered satisfied. Subsequent phases of construction will not be subject to additional LRRWMO stormwater standards, even in the event that the LRRWMO standards are changed. However, if later building construction occurs that is not consistent with the original common plan of development, then a new LRRWMO permit would be triggered and stormwater standards in effect at that time would apply.

Storm Sewer Design

Except as noted in this document (LRRWMO Stormwater Standards), the design of storm sewers shall be reviewed and approved by the municipality, not the LRRWMO. The LRRWMO must review and approve basin inlets and outlets.

Stormwater Basin Sizing and Design

Hydrologic and hydraulic design of stormwater basins shall be based upon:

- For basins that are not landlocked —Available storage volume shall be based on 100-year return period, 24-hr. duration, Atlas 14 rainfall using the NRCS MSE-3 distribution with average soil moisture conditions (AMC 2). Rainfall amounts using the National Oceanic and Atmospheric Administration’s update Precipitation Frequency Atlas for the Midwestern States (Atlas 14, Volume 8) can be found at www.dnr.mn.us/climate/noaa_atlas_14.html.

- For landlocked areas - Available storage volume shall be established by estimating the water surface elevation resulting from back-to-back 100-year frequency rainfall events, or the 100-year, 10-day snowmelt, whichever provides the higher water surface elevation. In the snowmelt scenario, frozen soils shall be assumed (CN=100).

Flood levels in landlocked basins are difficult to predict, as they depend upon the starting water elevation at the beginning of a storm event. The starting elevation of the waterbody prior to the runoff event shall be established by one of the following:

- Existing Ordinary High Water level established by the Minnesota Department of Natural Resources,
 - Annual water balance calculation approved by the LRRWMO,
 - Local observation well records, as approved by the LRRWMO, or
 - The elevation of hydric soils, or the highest anticipated ground water table or elevation shown by a geotechnical study accepted by the LRRWMO.
- Infiltration within the basin during frozen conditions will be allowed in the calculation of basin sizing. The infiltration rate used must be approved by the LRRWMO.
 - Ultimate development, based on the approved common plan of development and the city's future land use plan within the area tributary to the pond/waterbody, shall be assumed.
 - Modeling methodology acceptable to the LRRWMO. Methods currently approved by the LRRWMO include: USDA SCS, TR-55 and TR-20, HydroCAD, and EPA SWMM methodology.

Precipitation Data Sources

Rainfall amounts for hydrologic analyses should be based on:

- National Oceanic and Atmospheric Administration's updated Precipitation Frequency Atlas for the Midwestern States (Atlas 14, Volume 8). (Reference: www.dnr.state.mn.us/climate/nosa_atlas_14.html).

More recent updates of these documents should be used, if available.

Low Floor Elevation

The lowest floor elevation of all development, including basements, must be at least 3 feet above the highest anticipated ground water table, 2 feet above the designated or designed 100-year flood elevation, or 1 foot above the emergency overflow, whichever is higher.

This requirement may be waived if evidence that a lesser separation can be achieved is:

- submitted and certified by a geotechnical engineer,
- reviewed and approved by the city engineer or other party designated by the city engineer, and
- approved by the LRRWMO.

If this process is pursued, the developer should consult with the LRRWMO Engineer before beginning study to discuss acceptable methodologies.

Discharges to the Rum River

The Rum River is classified as an Outstanding Resource Value Water. State Rules 7050.0180 prohibit new or expanded discharges. Determinations about discharges that may or may not impact

the Rum River are made by the Minnesota Pollution Control Agency, and shall be addressed through MPCA regulatory processes.

Water Quality

- Treatment of storm water to MPCA Stormwater guidelines is required prior to stormwater discharge to a lake, stream, or wetland and prior to discharge from the site as part of development. The stormwater treatment facilities shall provide at least an annual removal efficiency of sixty (60%) phosphorus and at least an annual removal efficiency of ninety percent (90%) total suspended solids. The onsite abstraction of runoff may be included in demonstrating compliance with the total suspended solids and total phosphorus removal requirements.

Peak Flow Rate Control

Post-development peak runoff rates shall not exceed existing rates for the 2, 10, and 100 year storm peak discharges.

The Rational Method shall be the preferred methodology to calculate peak flow rates for the design of minor systems that do not require hydrograph routings. If a minor system requires the use of a hydrograph method for routing purposes, only methods pre-approved by the LRRWMO will be accepted. If the method is not currently approved by the City, documentation of the methodology used shall be submitted with the calculations. Hydrograph methods currently approved by the LRRWMO include: USDA SCS, TR-55 and TR-20, HydroCAD, and EPA SWMM.

Volume Control

A volume equal to one inch of runoff from all impervious surfaces on the site shall be infiltrated on-site.

In cases of redevelopment, this volume control requirement applies only if >50% of the project area is disturbed. Project area is defined as the parcel(s) to which the permit would apply or the area encompassed by the common plan of development, whichever is greater.

At a minimum, abstraction from 1-inch of runoff from the on-site impervious surfaces shall be provided.

Abstraction, through infiltration, shall not be allowed within a 1-year travel zone of a public well as determined by the municipal well-head protection plan.

Unless determined by the LRRWMO to be exempt or granted a waiver, the following shall be addressed for stormwater management of all sites:

1. Stormwater volume management practices shall attempt the equivalent of retaining 1-inch of runoff, while recognizing that meeting a full 1-inch may not be practical.
2. These practices should utilize pervious area for the retention of runoff from impermeable surfaces to the maximum extent practical to provide treatment for both water quantity and quality.

Use of an *existing* regional treatment facility with available treatment capacity for the required volume will be allowed as an exception to the infiltration requirements if the LRRWMO and the city where the project is occurring agree the facility has the capacity.

For all ponds, infiltration through the pond bottom, draining dry within 48 hours, does count toward the required volume to infiltrate. Dead storage alone, without infiltration of that stored volume, does not count toward the required infiltration volume. Evaporation or transpiration from pond surfaces

may not be counted toward infiltration volume requirement because evaporation does not yield water quality benefits, achieve groundwater recharge goals, and because it is highly variable based upon climatological conditions.

Infiltration Facility Design and Construction

The chapters on Infiltration in the Minnesota Stormwater Manual should be used as a reference in the design and construction of infiltration basins for the stormwater management. This includes, but is not limited to, soil borings, period of inundation, pretreatment, and protection during construction. Robust pretreatment to remove suspended solids is especially important to long term functioning of the practice. Infiltration rates used in design of infiltration practices shall be either those in the MN Stormwater Manual (see Table 1 below) or those measured on-site by a double-ring infiltrometer. A maximum infiltration rate of 3 in/hr is allowed. Rates used for design higher than those listed in Table 1 below shall be verified by post-construction testing.

TABLE 1. Infiltration Rates for Hydrologic Soil Groups

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
A	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW – Well-graded gravel or well-graded gravel with sand	1.6
		GP – Poorly graded gravel or poorly graded gravel with sand	
B	Loam, silt loam	GM – Silty gravel or silty gravel with sand	0.8
		SW – Well-graded sand or well-graded sand with gravel	
		SP – Poorly graded sand or poorly graded sand with gravel	
B	Loam, silt loam	SM – Silty sand or silty sand with gravel	0.6
		ML – Silt	0.3
C	Sandy clay loam	OL – Organic silt or organic silt with sand or gravel or gravelly organic silt	0.2
		GC – Clayey gravel or clayey gravel with sand	
		SC – Clayey sand or clayey sand with gravel	

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	CL – Lean clay or lean clay with sand or gravel or gravelly lean clay CH – Fat clay or fat clay with sand or gravel or gravelly fat clay OH – Organic clay or organic clay with sand or gravel or gravelly organic clay MH – Elastic silt or elastic silt with sand or gravel	0.06

Source: Minnesota Stormwater Manual. Thirty guidance manuals and many other stormwater references were reviewed by the MPCA when it compiled the recommended infiltration rates.

Sites Where Infiltration is Infeasible or Inappropriate

The LRRWMO recognizes that infiltration may be infeasible or inappropriate in some instances, and will review these on a case-by-case basis. Reasons that infiltration may be infeasible or inappropriate include:

- Physical limitations including soils, high water table, and available space limitations in the case of redevelopment.
- Projects within a Drinking Water Supply Management Area (DWSMA). Refer to MN Department of Health guidance entitled “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas” (<http://www.health.state.mn.us/divs/eh/water/swp/stormwater.pdf>) to determine if infiltration techniques are appropriate.
- Storm water discharges from potential stormwater hotspots, such as fueling stations, vehicle service or washing areas, vehicle fleet storage areas, auto recycling or salvage, stockpiled snow from salted roadways, construction site inputs, manufacturing sites, public works storage areas, facilities that generate or store hazardous waste materials, and others as determined by the community or watershed management organization.
- Utility locations.
- Contaminated soils.
- Others as determined by the LRRWMO.

In these scenarios, permittees must treat the required volume through the following techniques, in order of preference:

1. On site infiltration of the entire, or a portion of, the required volume.
2. On site filtration or off site infiltration within the LRRWMO. Excess volume reduction on any project may be banked for use on another off site project. The excess volume reduction bank will be administered by the LRRWMO.
3. Other non-volume control treatment on site.

4. Contribution to a stormwater impact fund held by the LRRWMO. This fund is used for projects that offset the volume reduction that permitted projects were unable to achieve. Such projects may occur throughout the LRRWMO, but funds are favored for use in the city where they originated. The LRRWMO determines the contribution amount necessary per acre of impervious surface. This amount is based upon actual expenditures of other projects to meet the same volume control standards.

Stormwater Facility Maintenance

Stormwater facility maintenance shall follow the recommendations of the MN Stormwater Manual, or for public agencies facility maintenance shall be in accordance with the provisions of their MS4 permit or approved Local Water Management Plan. An easement is required over the area inundated by the design high water level storm event (including elevations determined for land-locked basins) and additional area adequate to provide maintenance access. Where a private party is responsible for maintenance, a maintenance declaration and plan that runs in perpetuity and is approved by the LRRWMO must be placed on the property title.

Performance Surety

A performance surety shall be collected by either the LRRWMO or city, but not both, for stormwater practices. Practice performance must be measured after installation. The surety may be used to correct any deficiencies in performance, such as infiltration rate. Unused funds will be returned to the permittee one year after construction is completed and after the practice is performing satisfactorily.

The performance surety will be waived for public projects.