STORMWATER MANAGENEMT

DESIGN STANDARDS

Version 2.0
2022

Goals and Purpose:

The general purpose of this design guide is to establish regulatory requirements for land disturbing and construction activities to help safeguard persons, protect property, and prevent damage to the environment in the City of Glencoe. The goal is to establish requirements that will:

1) Assist in meeting the City's NPDES/SDS Municipal Separate Storm Sewer System (MS4) and Construction Stormwater General Permit requirements, set forth by the MPCA.
2) Assist in meeting Total Maximum Daily Load (TMDL) plan Waste Load Allocations (WLA) for impaired waters.
3) Protect life and property from dangers associated with flooding.
4) Protect public and private property and natural resources from damage resulting from stormwater runoff and erosion.
5) Provide a single, consistent set of performance goals that apply to all developments.
6) Establishing erosion and sediment control and waste control requirements for land disturbance activities within the jurisdiction of the City Glencoe.
7) Establishing post-construction stormwater management requirements to prevent or reduce water pollution after land disturbing activity is complete.
8) Promote infiltration and ground water recharge.
9) Protect functional values of all types of natural water bodies.

Compatibility with other Regulations:

The standards set forth in this document are not intended to modify or repeal any other ordinance, rule, regulation, or other provision of law. The standards of this document are in addition to the requirements of any other ordinance, rule, regulation, or other provision of law, and where any provision of these standards imposes restrictions different from those imposed by any other ordinance, rule, regulation, or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control.

Ultimate Responsibility:

The standards and requirements set forth herein and promulgated pursuant to these requirements are minimum standards; therefore, these requirements do not intend or imply that compliance by any person will ensure that there will be no contamination, pollution, or unauthorized discharge of pollutants.

Definitions:

"Best Management Practices" or "BMP" means practices to prevent or reduce the pollution of the waters of the state, including schedules of activities, prohibitions or practices, and other management practices, and also includes treatment requirements, operating procedures and practices to control site runoff, spillage or leaks, sludge, or waste disposal or drainage from raw material storage.

"Better Site Design" means the control and management of stormwater quantity and quality through the application of Better Site Design Techniques as outlined in the current version of the Minnesota Stormwater Manual: (http://stormwater.pca.state.mn.us/index.php/Main_Page).

"Construction Activity" means a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography that may result in accelerated stormwater runoff, leading to soil erosion and movement of sediment into surface waters or drainage systems. This may include clearing, grading, filling, and excavating.

"City" means the City of Glencoe

"Common plan of development or sale" is 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.

"Dewatering" means the removal of surface or ground water to dry and/or solidify a construction site to enable construction activity. Dewatering may require a Minnesota Department of Natural Resources water appropriation permit and, if dewatering water is contaminated, discharge of such water may require an individual MPCA NPDES/SDS permit.

"Energy Dissipation" means method employed at pipe outlets to prevent erosion caused by the rapid discharge of water scouring soils.

"Erosion Control Measure" means a measure that prevents soil particles exposure and detachment.

"Fully Reconstructed" means areas where impervious surfaces have been removed down to the underlying soils. Activities such as structure renovation, mill and overlay projects, and other pavement rehabilitation or resurfacing projects that do not expose the underlying soils beneath the structure, pavement, or activity are not considered fully reconstructed. Maintenance activities such as catch basin repair/replacement, utility repair/replacement, pipe repair/replacement, lighting, and pedestrian ramp improvements are not considered fully reconstructed.

"Green Infrastructure" is a wide array of practices at multiple scales that manages wet weather and that maintains or restores natural hydrology by infiltrating, evapotranspiring, or harvesting and using stormwater. On a regional scale, green infrastructure is the preservation or restoration of natural landscape features, such as forests, floodplains and wetlands, coupled with policies such as

infill and reconstruction that reduce overall imperviousness in a watershed. On the local scale, green infrastructure consists of site and neighborhood-specific practices.

"Karst" *(active) is* a geographic area underlain by carbonate bedrock (or other forms of bedrock that can erode or dissolve) with less than 50 feet of sediment cover.

"Land Disturbance" means any project or activity, including removal of vegetation, excavations, clearing, filling, stockpiling, grading, or other earth change that directly or indirectly affects slopes, water bodies, the moving of ground cover or which may result in the movement of sediment.

"Linear Project" means construction or reconstruction of roads, trails, sidewalks, and rail lines that are not part of a common plan of development or sale.

"MPCA Construction Stormwater Permit" means the most current Minnesota Pollution Control Agency (MPCA) General Permit to Discharge Stormwater Associated with Construction Activity Under the National Pollution Discharge Elimination System State Disposal System Program (NPDES/SDS).

"Municipal Separate Storm Sewer System" or "MS4" means the conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains owned and operated by the City of Glencoe.

"New Development" means all construction activity where new impervious surfaces are being created.

"Receiving Water" means any lake, river, stream, or wetland that receives stormwater discharges from the MS4.

"Saturated soil" is the highest seasonal elevation in the soil that is in a reduced chemical state because of soil voids being filled with water. Saturated soil is evidenced by the presence of redoximorphic features or other information.

"Sediment Control Measure" means a measure that prevents eroded sediment from leaving the site.

"Stormwater" means rainwater runoff, snow melt runoff, and surface runoff and drainage. (Minn .R. 7090.0080, subp.12.)

"Structural Stormwater BMPs" mean stationary and permanent BMPs designed, constructed and operated to prevent or reduce the discharge of pollutants in stormwater.

"Steep Slopes" means slopes that are 1:3 (V:H) (33.3 percent) or steeper in grade.

"Stormwater Pollution Prevention Plan" or "SWPPP" means a comprehensive plan developed to manage and reduce the discharge of pollutants in stormwater.

"Waters of the State" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems, and all other bodies or

accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.

Receiving Waters:

Buffalo Creek (River Segment 07010205-501)
Impaired for: Aquatic Macroinvertebrate Bioassessments; Fecal Coliform; Fishes Bioassessments; Dissolved Oxygen.
Approved TMDL for: Fecal Coliform; Dissolved Oxygen.
These impairments affect Aquatic Life, Aquatic Recreation.

Wetlands: Governed by Wetland Conservation Act (WCA)

Special (Prohibited, Restricted, Other) and Impaired Waters:

Prohibited Special Waters (Minn R. 7050.0035 Subp. 3): None known

Restricted Special Waters: None known

Trout Lakes and Trout Streams (Minn. R. 6264.0050, subp. 2 and subp. 4): None known

Prohibited Special Waters (Minn R. 7050.0035 Subp. 3): None known

Impaired Waters with an USEPA approved TMDL: Buffalo Creek

Other Considerations:

Impacts to Endangered or Threatened Species or Critical Habitats: None known

Adversely Affected Historical Properties: None known

Drinking Source Water: The City of Glencoe provides drinking water to its residents from groundwater sources. These include three (3) wells ranging from 575 to 800 feet deep, pumped from the Mt. Simon-Hinckley aquifer. The Minnesota Department of Health has determined that the source(s) used to supply the City of Glencoe with drinking water are not particularly susceptible to contamination. To help protect the integrity of the City's drinking water source infiltration will be restricted within 200 feet of drinking water well, meaning a higher level of design and review will be required in these areas prior to allowing infiltration practices to occur.

Related Review and Regulations:

Environmental Review Requirements (Minn R 4410 Environmental Review): Environmental reviews (EAW & EIS) shall be completed as required by Minnesota Administrative Rule, Chapter 4410, and Environmental Review

Glencoe Ordinance Requirements: https://www.glencoemn.org/city-government/city-ordinances-zoning-map/

MPCA Construction Stormwater Permit: http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/construction-stormwater/index.html

Buffalo Creek Watershed District: http://www.bcwatershed.org/

Crow River Organization of Water: http://www.crowriver.org/

Design Requirements:

Summary of Requirements

Disturbed Area → / Requirement ↓	1 acre or more
Grading Permit	X
Stormwater Pollution Prevention Plan (SWPPP)	X
Construction Site Stormwater Runoff Controls	X
Post-Construction Stormwater Management Requirements	X
MPCA Construction Stormwater Permit	X

Notes: Disturbed area includes all land disturbance and construction activity, including land area that is part of a larger common plan of development or sale. Where deemed necessary by the City of Glencoe to safeguard persons, protect property, and prevent degradation to the environment in the City of Glencoe, requirements may be enforced for disturbed areas with less than above identified amount.

Better Site Design

The City encourages the use of better site designs as identified in the current version of the Minnesota Stormwater Manual (https://stormwater.pca.state.mn.us/index.php/Better_site_design). Better site design involves a series of techniques applied early in the design process to reduce impervious cover, conserve natural areas, use pervious areas to treat stormwater runoff more effectively, and promote the treatment train approach to runoff management.

Stormwater Pollution Prevention Plan (SWPPP)

A SWPPP shall be submitted with the Grading Permit application. The SWPPP shall be consistent with the requirements outlined in this document, City ordinances, and State and Federal regulations.

A. SWPPP Plan Content. The SWPPP shall be completed prior to submitting a Grading Permit application and prior to conducting any land disturbing activities. SWPPP plan content must include at a minimum the items required and identified in the MPCA Construction Stormwater Permit. This includes information to meet the requirements of the Construction Site Stormwater Runoff Control and Post-Construction Stormwater Management sections of this document, where applicable.

Construction Site Stormwater Runoff Control Requirements

Site plans and project documentation must incorporate erosion and sediment controls and waste controls as required and identified in the MPCA Construction Stormwater Permit, including those identified in the MPCA Construction Stormwater Permit for discharges to special and impaired waters, when applicable. (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/construction-stormwater/index.html)

These requirements are briefly described below:

A. Erosion Prevention Practices (Permit Section 8). Erosion Prevention Practices (BMPs) must be planned for, implemented, and maintained to prevent soil particle exposure and detachment in order to minimize site erosion.

B. Sediment Control Practices (Permit Section 9). Sediment Control Practices (BMPs) must be planned for, implemented, and maintained to prevent eroded sediment from leaving the site and to minimize sediment and other pollutants from entering surface waters, including curb and gutter systems and storm sewer systems.

C. Dewatering and Basin Draining Activities (Permit Section 10). Dewatering or basin draining activities to remove surface or ground water to dry and/or solidify a construction site to enable construction activity must incorporate appropriate BMPs to discharge in a manner that does not cause nuisance conditions. Dewatering may require a Minnesota Department of Natural Resources water appropriation permit and, if dewatering water is contaminated, discharge of such water may require an individual MPCA NPDES/SDS permit.

D. Site Inspection and Maintenance (Permit Section 11). Construction sites must be inspected on a regular basis to ensure the integrity and effectiveness of all erosion prevention BMPs, sediment control BMPs, and pollution prevention management measures. All non-function BMPs must be repaired, replaced, or supplemented with functional BMPs.

E. Pollution Prevention Management Measures (Permit Section 12). Construction sites must incorporate pollution prevention management measures to reduce the probability of spills, leaks or discharges of pollutants.

F. Final Stabilization (Permit Section 13). Upon the completion of construction activity final stabilization must be completed to include perennial vegetative cover on all exposed soils.

G. Temporary Sediment Basins (Permit Section 14). Temporary sediment basin(s) are required to treat runoff where deemed necessary by the MPCA Construction Stormwater Permit and where deemed necessary by the City of Glencoe to safeguard persons, protect property, and prevent degradation to the environment.

Post-Construction Stormwater Management Requirements.

Site plans and project documentation must incorporate post-construction (permanent) stormwater management best management practices/systems to manage stormwater long term once construction activity is complete. Permanent stormwater systems shall be designed consistent with the Minnesota Stormwater Manual (http://stormwater.pca.state.mn.us/index.php/Main_Page), the MPCA Construction Stormwater Permit, and in accordance with the following requirements:

A. Green Infrastructure. Green Infrastructure techniques and practices (including, but not limited to, infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs, etc.), shall be given preference as design options consistent with zoning, subdivision and PUD requirements.

   A combination of techniques which utilize infiltration, capture and reuse, evapotranspiration and other types of low impact development techniques are encouraged, rather than relying on a single practice or infiltration alone.

B. Stormwater Runoff Rate Control. Post-development peak flow rates at each discharge point from the project area shall not exceed pre-development peak flow rates for the 2, 10, and 100-year, 24-hour storm events.

C. Storm Sewer Conveyance System. Local storm sewer systems shall be designed for the 10-year storm event. The Rational Method shall be the preferred methodology for design of local systems. Culvert crossings or storm systems in County or State right-of-way may have a design frequency and requirements which differ from the City's requirements. The Designer shall contact each agency/unit of government to determine the appropriate design requirements and frequency for hydrologically-connected systems.

D. Flood Control.

   1. The low floor elevation shall be set to the higher of the following:
      a. Where an effective Base Flood Elevation (BFE) has been established the low floor elevation adjacent to a surface water body shall be established in accordance with the City's Floodplain Ordinance.
      b. The low floor elevation shall be two (2) feet or more above the 100-year/24-hour event as determined by a technical evaluation by a qualified engineer or hydrologist.
   2. An emergency overflow shall be incorporated into the site design at or above the BFE or modeled high water level to convey a 100-year discharge away from buildings to the next downstream water body. The lowest opening shall be at least one and a half (1.5) feet above the emergency overflow elevation of the adjacent water body.
   3. Existing, natural or man-made emergency overflows shall be analyzed as part of the design process.

4. Where natural overflows do not exist, the designer shall consider the possibility of long duration and extreme events. High water elevations shall be determined with analysis based on runoff volume resulting from a 100-year/10-day snowmelt (7.2 inches and saturated or frozen soil conditions [CN=100}) and/or the runoff resulting from a 100-year back-to-back rain event.

E. Water Quality Treatment and Volume Control Requirements. Post-construction stormwater management is required for any project where the sum of new development and fully reconstructed areas equal one or more acres. Post-construction stormwater management must provide treatment of the water quality volume consistent with the requirements identified below. Volume reduction practices must be considered first. Defensible and consistent hydrological assessments and modeling methods shall be provided to demonstrate compliance.

1. Non-Linear New Development and Fully Reconstructed Areas. Nonlinear development and fully reconstructed projects, on sites without restrictions, shall capture and retain on site 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces.
2. Linear Developments. Linear projects, on sites without restrictions, shall capture and retain the larger of the following:
    a. 0.55 inches of runoff from the new and fully reconstructed impervious surfaces on the site.
    b. 1.1 inches of runoff from the net increase impervious area on the site.
3. Sites with Restrictions. Every attempt to comply with the performance standards identified above shall be made. If full compliance with the performance standards is not possible due to any of the factors identified below, the reasons must be clearly documented. Options should be considered and documented to examine the merits of relocating project elements to address varying soil conditions and other constraints across the site. Infiltration is prohibited in the following areas:
    a. Areas that receive discharges from vehicle fueling and maintenance areas
    b. Areas where there are high levels of contaminants in soil or groundwater
    c. Areas where soil infiltration rates are more than 8.3 inches per hour, unless soils are amended
    d. Areas with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock
    e. Areas of predominately Hydrologic Soil Group D (clay) soils
    f. Areas in an Emergency Response Area (ERA) within a moderate vulnerability DWSMA
    g. Areas within a high or very high vulnerability Drinking Water Supply Management Area (DWSMA)
    h. Areas located 1,000 feet up-gradient or 100 feet down-gradient of active karst features

i. Areas that receive industrial stormwater runoff regulated under the NPDES ISW program

4. For non-linear projects, where the water quality volume cannot cost effectively be treated on the site of the original construction activity, off-site treatment / mitigation at an off-site location may be implemented at the City's discretion. The off-site treatment must meet the performance of 1.1 inches of volume reduction for the sum of new development and fully reconstructed standards identified above. The owner and/or operator must provide appropriate documentation to the City as support and the proposed mitigation must meet the following criteria:
    a. Off-site treatment / mitigation at an off-site location may be implemented at the City's discretion. The off-site treatment must meet the performance of 1.1 inches of volume reduction for new development or fully reconstructed standards identified above. The owner and/or operator must provide appropriate documentation to the City as support and the proposed mitigation must meet the following criteria:
        i. Mitigation project areas should be selected in the following order of preference. Proposed mitigation locations must be reviewed and approved by the City:
            1. Locations that yield benefits to the same receiving water that receives runoff from the original construction activity
            2. Locations within the same Department of Natural Resource (DNR) catchment area as the original construction activity
            3. Locations in the next adjacent DNR catchment area up-stream
            4. Locations within the City
    b. Mitigation projects must involve the creation of new structural stormwater BMPs, the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
    c. Routine maintenance of structural stormwater BMPs cannot be used to meet mitigation requirements.
    d. Mitigation projects must be completed within 24 months after the start of the original construction activity.
    e. If the mitigation project is a private structural BMP and the City is not responsible for long-term maintenance of the project, the City will require written and recorded documentation of maintenance responsibilities.
5. For linear projects, where the entire water quality volume cannot be treated within the existing right-of-way, a reasonable attempt to obtain additional right-of-way, easement, or other permission to treat the stormwater during the project planning process must be made, with consideration to volume reduction practices first. If additional right-of-way, easements, or other permission cannot be obtained, owners of construction activity must maximize the treatment of the water quality volume prior to discharge. Documentation must be provided to the City.

F. Design Computation Criteria.

1. Rain fall amounts and distributions for storm water management and conveyance system analysis shall utilize the SCHAUER_ Station (Site ID: 80-0280), located near Glencoe, MN, NOAA Atlas 14 data and antecedent moisture conditions 2 (AMC-2).
2. The City may require designers to run additional modeling scenarios with rainfall depths greater than the 100-year event. For example, modeling a 10-inch event or back-to-back 100-year events will allow the designer and require to evaluate the sensitivity of the system response to larger events relative to detention/retention area high water levels and emergency overflow paths. The designer is encouraged to run extreme events scenarios as part of the initial site evaluation and design process.
3. Outlet energy dissipation shall be designed in accordance with MnDOT Design Criteria.
4. Permanent stormwater facilities shall provide adequate maintenance access. Vehicle lanes of not less than 10-feet wide and 15 percent slope shall be provided to access the facilities.
5. Infiltration and Filtration Practices:
    a. Shall provide for pre-treatment of runoff to trap sediment prior to entering the infiltration system.
    b. Must be designed to draw down to the bottom elevation of the practice within 48 hours. The maximum ponding depth shall be based on the soil infiltration rate determined from site specific soil investigation data taken from the location of proposed infiltration practice(s) on site.
6. Stormwater Wet Ponds:
    a. Shall have a minimum 3-foot permanent ponding depth and maximum 10-foot permanent ponding depth.
    b. Shall have a minimum 20-foot buffer around the perimeter of the basin. The buffer shall extend from the 100-year high water level.
    c. Shall have an aquatic bench having 10:1 (H:V) slope for the first 10 feet extending down from the normal water level of the basin.
    d. Shall have a 3:1 maximum side slope.
    e. Shall be configured to prevent short circuiting.
    f. Shall have submerged outlet pipes designed to minimize or eliminate the discharge or oils and floatable materials.
    g. Shall include liner material (compacted cohesive soils, geosynthetic materials, plastic liner, soil additives, or other material) when located in areas with high infiltration rates and/or when located in areas with prohibited infiltration to create a permanent pool and prevent contamination of ground water.

G. Long Term Maintenance of Stormwater BMPs. The type and interval of maintenance activities for stormwater BMPs are often dependent upon the degree of pollutant loading from a particular drainage basin. BMP maintenance can be broken into three categories: inspection,

routine maintenance, and major maintenance.

1. Private Facilities
    a. Maintenance Agreement. As supported by the City's Construction Site and Post-Construction Stormwater Management Ordinance, the owner shall enter into a Maintenance Agreement with the City. A maintenance agreement template can be found in Appendix A.
    b. Maintenance Plan. As supported by the City's Construction Site and Post-Construction Stormwater Management Ordinance, an inspection and maintenance plan shall be developed, approved, and included as an attachment with the Maintenance Agreement. The Minnesota Stormwater Manual provides guidance for post-construction operation and maintenance which may be used for plan development. At a minimum, maintenance plans must include the following information:
        i. Inspections
            1. Responsible person(s) for completing inspections.
            2. Frequency inspections are to be completed. At a minimum, stormwater facilities must be inspected annually.
            3. Each BMP type has its own unique characteristics. However, inspections will generally consist of an assessment to assure its functionality and general condition.
        ii. Routine Maintenance
            1. Responsible person(s) for conducting routine maintenance.
            2. Frequency routine maintenance is to be completed. At a minimum, routine maintenance must be completed at a frequency necessary to maintain the performance standard they were designed for.
            3. The type of routine maintenance anticipated. Routine maintenance will generally consist of trash and vegetation removal, unclogging of drains, minor sediment removal, and exchange of filter media where applicable.
        iii. Major Maintenance
            1. Responsible person(s) for conducting major maintenance.
            2. Anticipated frequency major maintenance is to be completed. At a minimum, major maintenance needs to be completed as required from inspection reports and/or when there are failures in the BMP.
            3. Type of major maintenance anticipated. Major maintenance generally consists of significant reconstruction including dredging, excavation, removal of existing media, replacing fabric, replacing the under-drain, and reestablishment of vegetation.

2. Public Stormwater Facilities
    a. Acceptance of publicly owned stormwater facility. Prior to final acceptance of the facility the following must be completed:

i. Submittal of as-built drawing.
ii. Documentation certifying the BMP has been constructed in accordance with design specifications.
iii. Final inspection with City staff or City representative.

Appendix A

Maintenance Agreement Template