Safety and Permits

STORMWATER MANAGEMENT FOR DEVELOPMENT

New Orleans' understanding and relationship with water has changed dramatically over the decades and its water policy has improved with it. We now know that living with water will be paramount to the City's future success. As the City has learned more about this relationship, through publications like the Greater New Orleans Urban Water Plan, published in 2013, the City has worked tirelessly to implement aggressive stormwater management requirements for new developments and redevelopments including the City's Resilience Strategy, ResilientNOLA, released in August 2015, which adopted the urban water plan and committed the city to investing in comprehensive and innovative urban water management.

The City has also worked to include requirements to assist in the development of a resilient New Orleans by encouraging sustainable practices for site design, construction and maintenance. The regulations help reduce urban runoff and mitigate the effect of new development, redevelopment, or infill development on the existing drainage system. They also ensure the preservation of permeable surfaces and require the installation of stormwater BMPs to slow surface flow of stormwater runoff and promote filtration, plant uptake, absorption, and infiltration into sub-soils to reduce subsidence rates.

The City is also a co-permittee under the permit for Municipal Separate Storm Sewer System ("MS4") discharges. The City is obligated to comply with the Permit, including the implementation of a Stormwater Management Plan or equivalent, which requires Best Management Practices ("BMPs") for all construction activity, good housekeeping practices, and post-construction BMPs for development projects.

City of New Orleans Stormwater Code

In March of 2018, The City of New Orleans officially replaced Article 23 of the Comprehensive Zoning Ordinance (CZO) with a new unified Stormwater Code located within Chapter 1, Section 121 of the Building Code. The new code contains requirements to protect the City's drainage system during construction, as well as post-construction stormwater management requirements for some projects.

Construction Requirements

The new code requires that all contractors working within the City of New Orleans must provide erosion and sediment control on sites where ground is disturbed; and provide catch basin protection for any adjacent facilities. Further requirements apply to the washout of concrete trucks, and other onsite protections.

Post-Construction Requirements

These requirements apply to any new development or redevelopment, aside from single-, two-family, or residential properties with less than six (6) dwelling units, that is five thousand (5,000) square feet or more of impervious surface, or a total site area of one (1) acre or more. It requires that the plan retain or detain, and filter the first one and one quarter inch (1.25") of stormwater runoff during each rain event and limit the post-development runoff rate.

WHAT IS THE PROCESS?

1. Upon submission of a building permit, the Department of Safety and Permits (DS&P) will determine whether a stormwater management plan is required.
2. Once an application is submitted, Stormwater Review staff will deem the application complete based on the submittal requirements and review the application for compliance with the standards in the Stormwater Code.
3. Once a plan is approved the building permit will be issued.
4. After construction is complete, the designer will submit as-built drawings of the stormwater BMPs and connections. Once approved, the owner will record the as-built drawings with the 25% performance bond with the Notarial Archives and the Office of Conveyances.
5. Stormwater features are subject to biennial inspection and recertification in perpetuity.

WHO CAN DESIGN A STORMWATER MANAGEMENT PLAN FOR A SITE?

A Professional Engineer or Landscape Architect, licensed in Louisiana is required.

To find a registered landscape architect licensed by the Louisiana Horticulture Commission, please visit: http://www.ldaf.state.la.us/ldaf-programs/horticulture-programs/louisiana-horticulture-commission/ (http://www.ldaf.state.la.us/ldaf-programs/horticulture-programs/louisiana-horticulture-commission/)

To find a registered professional engineer licensed by the Louisiana Professional Engineering and Land Surveying Board (LAPELS), please visit: http://www.lapels.com (http://www.lapels.com).

WHAT IS REQUIRED TO SUBMIT AN APPLICATION FOR REVIEW?

- Submittal requirements (/nola/media/One-Stop-Shop/Safety%20and%20Permits/Stormwater-Code-Submittal-Requirements-3-14-18.pdf)
- Infiltration Rate Evaluation Guidelines (/nola/media/One-Stop-Shop/Safety%20and%20Permits/Infiltration-Testing-Guidelines-Att2.pdf)
- New Orleans Green Infrastructure Calculator (/nola/media/One-Stop-Shop/Safety%20and%20Permits/NOLA-GI-Toolkit_Stormwater-Calculator_V1-3_locked.xlsx) *UPDATED 9/17/18*

FEE IN LIEU

The stormwater management standards contained in the Stormwater Code are intended to encourage development that is environmentally functional, economically viable, and aesthetically pleasing. They are not intended to inhibit creative development. It is acknowledged that conditions may arise where normal compliance is impractical or impossible and project conditions associated with individual sites may justify approval of a payment of a fee-in lieu of compliance with the standards. Applications for payment of the fee are subject to the approval of the Director of the Department of Safety and Permits and must meet the following standards:

1. Stormwater management within the site is achieved to the maximum extent feasible;
2. The cost of materials, construction, and maintenance that would be required to comply on site; and
3. The topography, soil, vegetation, drainage, spatial limitations, unusually shaped pieces of land, unusual servitude requirements, or superseding regulatory requirements are such that full compliance is impractical.

For guidance on submitting a fee-in lieu application, please contact stormwater@nola.gov (mailto:stormwater@nola.gov).

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City of New Orleans: Stormwater Code Post-Construction Submittal Requirements

Effective 3/14/18

Any application for a building permit that triggers Stormwater Review under the Stormwater Code, must submit the following documents prepared by a Professional Engineer or Landscape Architect, licensed to work in the State of Louisiana:

a. **Project Description.** Brief summary of existing conditions and proposed stormwater management design.

b. **Existing Site & Drainage Plan.** A site assessment detailing the current drainage conditions on the property. This shall include:

   1. Location and boundaries of all existing property lines, lot names, easements or servitudes, or other land divisions for the development site;
   2. Location and boundaries of all adjacent rights-of-way, streets, private roads, drainage rights-of-way, or other features;
   3. Existing drainage areas delineated with flow lines indicating direction of flow;
   4. All above ground and subsurface infrastructure and invert elevations, including but not limited to existing drain lines, culverts, catch basins, headwalls, manholes, and existing BMPs;
   5. Location of all existing roof and yard drains, downspouts, or other features and their connections to BMPs
   6. Existing topographic and any significant topographic features at a maximum of 1' elevation intervals. If the site is less than 2% slope, NAVD88 point elevations are required at a minimum of every 25' and at the property line.
   7. Soil conditions;
   8. All existing buildings, structures, land covers and site features, including but not limited to curb cuts, interior streets, driveways, parking and loading areas, landscaped areas, and lawns.

c. **Infiltration Test Results.** All plans shall include the results of at least one (1) infiltration test per BMP, signed and sealed by a registered professional engineer or landscape architect licensed in the State of Louisiana, conducted according to the City of New Orleans Infiltration Rate Evaluation Guidelines.

d. **Proposed Site & Drainage Plan.** A detailed representation of the proposed drainage site design. This shall include:

1. Location and boundaries of all property lines, lot names, easements or servitudes, or other land divisions for the development site;
2. Location and boundaries of all adjacent rights-of-way, streets, private roads, drainage rights-of-way, or other features;
3. Proposed drainage areas delineated with flow lines indicating direction of flow;
4. All proposed above ground and subsurface infrastructure and invert elevations, including but not limited to drain lines, culverts, catch basins, headwalls, manholes, and BMPs;
5. Location of all proposed roof and yard drains, downspouts, or other features and their connections to BMPs
6. Proposed topographic and any significant topographic features at a maximum of 1' elevation intervals. If the site is less than 2% slope, NAVD88 point elevations are required at a minimum of every 25' and at the property line.
7. All proposed buildings, structures, land covers and site features, including but not limited to curb cuts, interior streets, driveways, parking and loading areas, landscaped areas, and lawns.
8. Sections and details of all proposed BMPs showing depth, dimensions, compositional layers, drainage media, overflows, connections into and out of all drainage related features.

e. **Calculations.** Calculations for pre and post-development runoff rate, required detention volume and capacity of BMPs, and empirically estimated pollutant load calculations completed and provided using the latest version of the City of New Orleans Green Infrastructure Calculator. If the proposed BMPs are not included in the calculator, the same calculation methods shall be used and provided in Excel format.

f. **Implementation Methods & Cost Estimate.** The estimated and itemized cost of construction, materials and two (2) years of maintenance of all proposed stormwater BMPs, and an implementation overview including designer's specifications for construction to protect BMPs, avoid soil compaction, and prevent BMP failure.
g. **Operations & Maintenance Plan.** Site-specific operations and maintenance schedule for each BMP including routine maintenance, frequency of inspections, indications of failure, corrective actions (repair and replacement), and a sample inspection report for the site.
h. **Stormwater Pollution Prevention Plan.** Narrative and plans demonstrating appropriate erosion and sediment control during construction.
i. **Landscape Plan.** When plants, trees, or shrubs are utilized in BMP design.

ATTACHMENT 2:
INFILTRATION RATE EVALUATION GUIDELINES

An evaluation of infiltration rate is necessary to determine if infiltration is feasible and to establish design infiltration rates for stormwater Best Management Practices (BMP). There are three basic steps for evaluating a site's infiltration rate:

A. **Desktop Study**
Desktop resources such as soil survey maps, published reports, or other available data is appropriate for screening to assess the feasibility and desirability of infiltration. The infiltration rate can be derived from the hydraulic conductivity listed in the U.S. Department of Agriculture National Resources Conservation Service Soil Survey for the location and soil type reported for the site. Geotechnical data from previous site studies or nearby representative locations may also be used. If a range of hydraulic conductivity values is available, estimate the infiltration rate as the geometric mean. Porous Pavement for Pedestrian Use may be designed without additional field verification or sampling. Additional field sampling or testing is required for other infiltration-dependent controls.

B. **Field Sampling**
The purpose of field sampling is to evaluate the depth and texture of soil at the location of the proposed water quality control. Field sampling activities must be conducted under the direction of a licensed Landscape Architect or Engineer. Soil depth and texture within the proposed footprint of the control must be evaluated via test pits, probes, borings, or similar means at a minimum frequency of one test location per 1,000 square feet. The probe or hole must extend to the minimum soil depth required for the proposed control. For example, the depth to an impermeable layer must be at least 2 feet below the bottom of a rain garden. If the bottom of the proposed rain garden is 1.5 feet below existing ground, the probe or hole must extend a minimum depth of 3.5 feet. Soil samples must be collected and evaluated at a depth below the expected bottom of the infiltration BMP (i.e., in the layer of underlying soil where infiltration will occur). Soil texture of representative samples may be classified in the field or by laboratory methods such as sieve and hydrometer analysis. Based on the soil texture determined in the field, a representative infiltration rate can be estimated from desktop resources (as described above). In the event that soil textures in the field differ from published references, additional testing and analysis must be conducted to establish a representative infiltration rate.

C. **In-situ Testing**
In-situ infiltration testing methods provide the most accurate estimate of infiltration rate. A variety of in-situ tests are available for measuring the infiltration capacity of the soil. Laboratory tests are not recommended because typical laboratory samples are less representative of field conditions.

In-situ testing must be conducted under the direction of a registered professional engineer licensed by the Louisiana Professional Engineering and Land Surveying Board (LAPELS). Testing must be conducted at a **minimum of two times within each proposed infiltration BMP area**[1]. When more than one infiltration test is conducted for a single control, a representative infiltration rate may be calculated as the geometric mean of the test results. Such tests should be conducted at a minimum depth of two feet below the proposed infiltration interface of the BMP (the lowest elevation where infiltration is proposed). Based on observed field conditions, the designer may elect to modify the proposed bottom elevation of the control. Personnel conducting infiltration tests should be prepared to adjust test locations and depths depending on observed conditions.

Designers should be aware of the difference between percolation tests and infiltration tests when determining the infiltration rate. A measured infiltration rate can be determined from a single or double ring infiltrometer test. However, a percolation rate determined from the simple open pit percolation test is related to the infiltration rate but tends to overestimate infiltration rates due to both downward and horizontal movement of water. Infiltration rates correspond only to the downward movement of water.

Testing methods that may be used but not discussed in detail in this section include:

- Single Ring Infiltrometer Test (ASTM D5126).
- Double Ring Infiltrometer Test (ASTM D3385).
- Guelph Permeameter.
- Constant Head Permeameter (Amoozemeter or USBR Procedure 7300-89).
- Other analysis methods at the discretion of the designer and approval of the Executive Director of the City Planning Commission.

[1] For small BMPs or innovative approaches, the Executive Director may reduce or waive this requirement.

INFILTRATION RATE EVALUATION GUIDELINES (cont.)

D. Percolation Test Protocol

The percolation test is geared towards investigating smaller infiltration facilities (i.e., facilities with drainage areas 2 acres or less and maximum ponding depths 12 inches or less). The test can be conducted using simple tools and manual labor, and does not require extensive excavation.

1. Test Preparation

   - The test hole opening shall be between 8 and 12 inches in diameter or between 7 and 11 inches on each side if square.
   - The bottom elevation of the test hole shall correspond to the bottom elevation of the proposed control (infiltration surface).
   - Place approximately 2 inches of gravel in the bottom of the hole to protect the soil from scouring (optional).
   - If horizontal infiltration is to be allowed, scarify the sides of the test hole.
   - Pre-soak the hole by carefully filling it with water. If the hole has not drained completely within 24 hours, then an infiltration design is not recommended. Testing may commence after all of the water has percolated or after 15 hours has elapsed since initiating the pre-soak. However, to approximate saturated conditions, testing must commence no later than 26 hours after all pre-soak water has percolated through the test hole.
   - Place a bar over the top of the hole or a nail near the top of the hole to serve as a datum from which depth measurements will be made.
   - Measure the depth and diameter of the test hole.

2. Test Procedure

   - Carefully fill the hole with water to a level greater than or equal to the maximum ponding depth of the rain garden. Measure this water elevation and the time it was taken.
   - Measure the water surface elevation as it drops, and record the time of each measurement. Measurements shall be taken with a precision of 0.25 inches or better. The number of measurements, and thus time required to conduct the testing, will depend on the infiltration rate of the soil and the time available. Refill the hole as necessary to extend the test to at least 2 hours. The test can be terminated when near steady-state conditions (i.e., when the rate of drop is approximately constant). Alternatively, terminate the test when the test hole is empty (this may require a much longer test period).
   - Calculate the percolation rate using representative steady-state data points from the latter stages of test where the rate of drop is approximately constant. The percolation rate is the change in water elevation (in inches) by the corresponding time interval (in hours).
   - Convert the steady-state percolation rate (p) to a representative infiltration rate (i) using the reduction factor (Rf) as follows:

     $\mathbf{i = p/R_f}$

     The reduction factor (R_f) is given by:

     $\mathbf{R_f = ((2d_1 - \Delta d)/D) + 1}$

     Where:

     D_1 = water depth at start of representative time interval (in.)

     Δd = water level drop during representative time interval (in.)

     D = diameter of percolation hole (in.)

     The reduction factor accounts for water losses through the sides of the percolation hole. It assumes that the percolation rate is affected by the depth of water in the hole and that the hole is located in uniform soil. If there are deviations from these assumptions, then other adjustment may be necessary.

Source: Adapted from City of Austin, TX Environmental Criteria Manual