



- Inspection date,
- Latitude and longitude and nearest street address,
- SCM owner information (e.g., name, address, phone number, email)
- A description of SCM condition including: vegetation and soils; inlet and outlet channels and structures; embankments, slopes, and safety benches; spillways, weirs, and other control structures; and any sediment and debris accumulation,
- Photographic documentation of SCMs, and
- Specific maintenance items or violations that need to be corrected by the SCM owner along with deadlines and re-inspection dates.

## 6.8 Sinkholes and Drainage Wells

In alignment with Planning Commission policy, sinkholes are to be included in open space. Metro defines sinkholes as follows:

*A sinkhole is a depression that occurs naturally in a karst area with no surface outflow of water and shall be identified by the first closed contour on 2-foot contour interval map or as designated by the Tennessee Department of Environment and Conservation.*

If a party disagrees with a sinkhole as determined by a contour map or as identified by MWS, the party may appeal to TDEC for review. If TDEC determines the feature not to be a sinkhole, Metro will defer to TDEC's determination.

All stormwater management systems discharging to sinkholes or drainage wells shall be designed using the 100-year storm. A geologic investigation and report as described in Section 4.2.2.4 is required, along with a demonstration that development will not occur within the area flooded by the 100-year storm. The project must also comply with all state and federal sinkhole permitting requirements. Any lost sinkhole volume from the 100-year storm event will need to be compensated within the development or demonstrate that no adverse conditions will occur.

## 6.9 Water Quality Buffers

### 6.9.1 Identification of Community Waters and Application of Buffers

New development, significant redevelopment, and sites needing a Grading Permit are required to preserve water quality buffers along Metro's community waters. Buffers shall be clearly marked on site development plans, Grading Permit applications, plats and/or concept plans. Community waters include the following:

1. Intermittent and perennial streams (and their source springs)



2. Lakes and ponds with hydrologic connectivity (stream leading into/out of the pond or obvious spring input)
3. Wetlands that have been identified by the U.S. Army Corps of Engineers, TDEC, or MWS staff.

Intermittent streams are natural or man-made watercourses (streams), which may cease to flow for sustained periods during a normal rainfall year (typically during the later summer through fall months). Perennial streams generally flow year-round, however they too may also run dry during years of extreme drought. Both intermittent and perennial streams will be collectively referred to as “streams” throughout this manual.

Channels identified on Metro’s GIS layer as streams or as draining 40 acres or more must be buffered unless the developer can clearly demonstrate the watercourse in question is not a community water. Hydrologic determinations can be performed by qualified staff either using MWS’ Hydrologic Determination Policy or TDEC’s Guidance for Making Hydrologic Determinations. These hydrologic determinations must be submitted to MWS for review prior to acceptance. MWS will also accept determinations performed by TDEC. Please contact MWS for additional information.

Where Metro’s Water Quality Buffer requirements differ from TDEC’s Construction General Permit (CGP) buffer requirements, the more restrictive requirement shall apply. Furthermore, the Grading Permit plans must address how and when the transition from the CGP buffer requirement to Metro’s buffer requirement will transpire on the site.

#### *6.9.2 Buffer Widths*

The following buffer widths and zones shall be applied to community waters, as described in Section 6.9.1. **Zone 1** for all buffers shall be considered a “no disturb zone”, where the vegetation cannot be disturbed, removed or replanted unless a buffer restoration plan has been approved by MWS. **Zone 2** can consist of managed vegetation, meaning the buffer zone can be disturbed and planted with grass or other vegetation. However, no structures or impervious surfaces shall be placed in Zone 2. This includes Permanent Treatment Practices (SWMM Vol. 4) and Green Infrastructure Practices (SWMM Vol. 5) that are being used to meet a site’s water quality and/or quantity requirements. In defining the inner limits of stream buffers, top of bank is defined as the uppermost limit of the active channel of a stream during “bank full” conditions, usually marked by a break in slope. The tops of bank must be properly illustrated and labeled on plats submitted for review.

#### Streams

1. Streams draining < 100 acres: 30’ from top of bank; Zone 1=30’ (See Figure 6-1)
2. Streams draining  $\geq$  100 acres, but < 1 square mile: 50’ from top of bank; Zone 1=30’ and Zone 2=20’ (See Figure 6-2)
3. FEMA studied streams, streams with a Local Flood Study, or streams with a drainage area  $\geq$  1 square mile: 75’ from the floodway, Zone 1=floodway + 50’ and Zone 2=25’ (See Figure 6-3). MWS staff may allow a large undisturbed floodway to count towards the buffer requirement in consultation with Metro Parks and Greenways if the



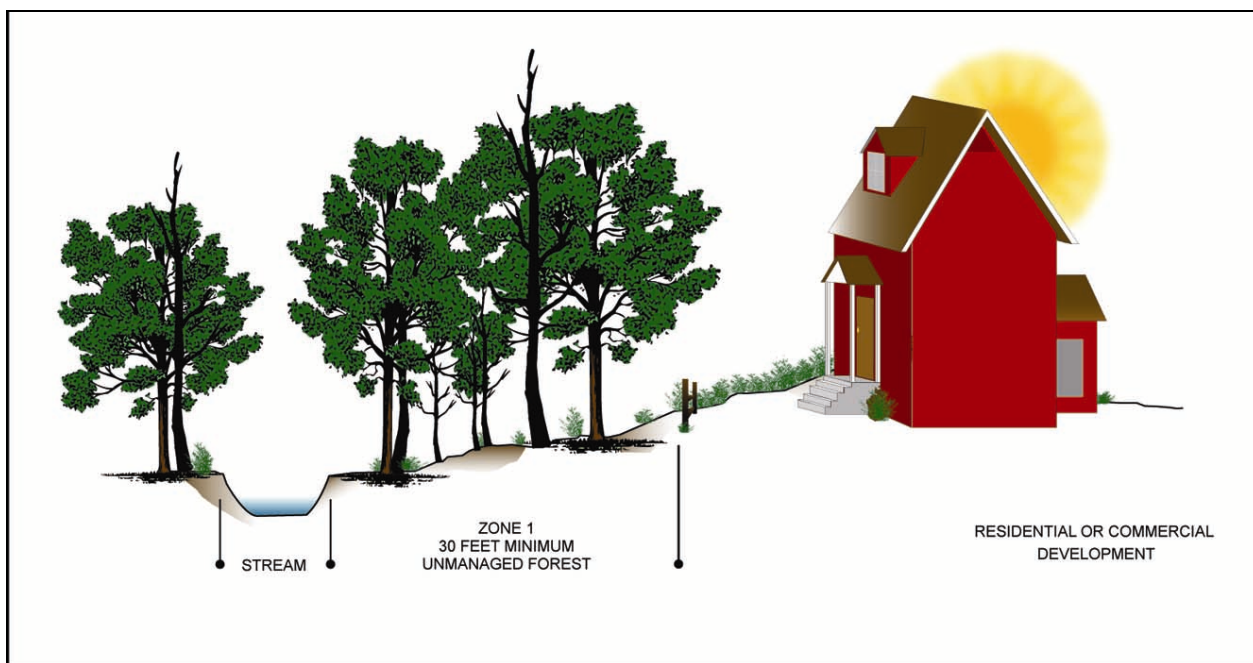
undisturbed area complies with the requirements of the floodplain overlay district and if staff determines that the undisturbed area would adequately serve water quality functions.

#### Ponds

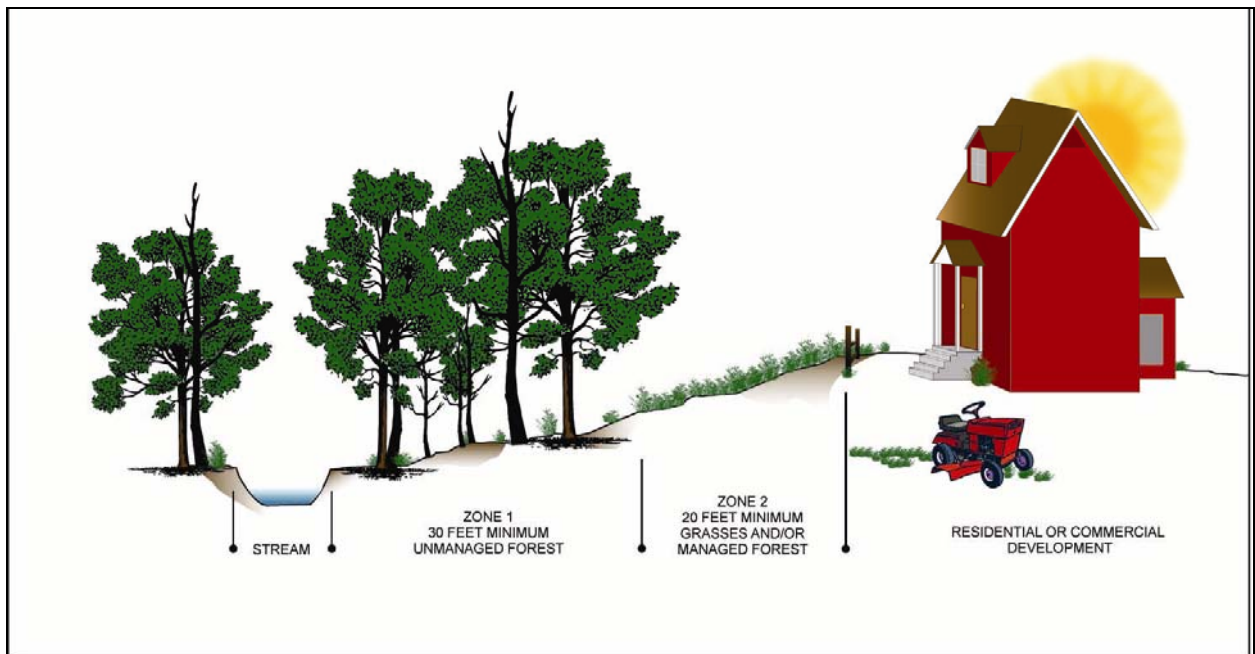
Ponds with hydrologic connectivity (stream leading into/out of the pond or obvious spring input): 25' from normal water pool, with Zone 1 = 10' and Zone 2 = 15'

#### Wetlands

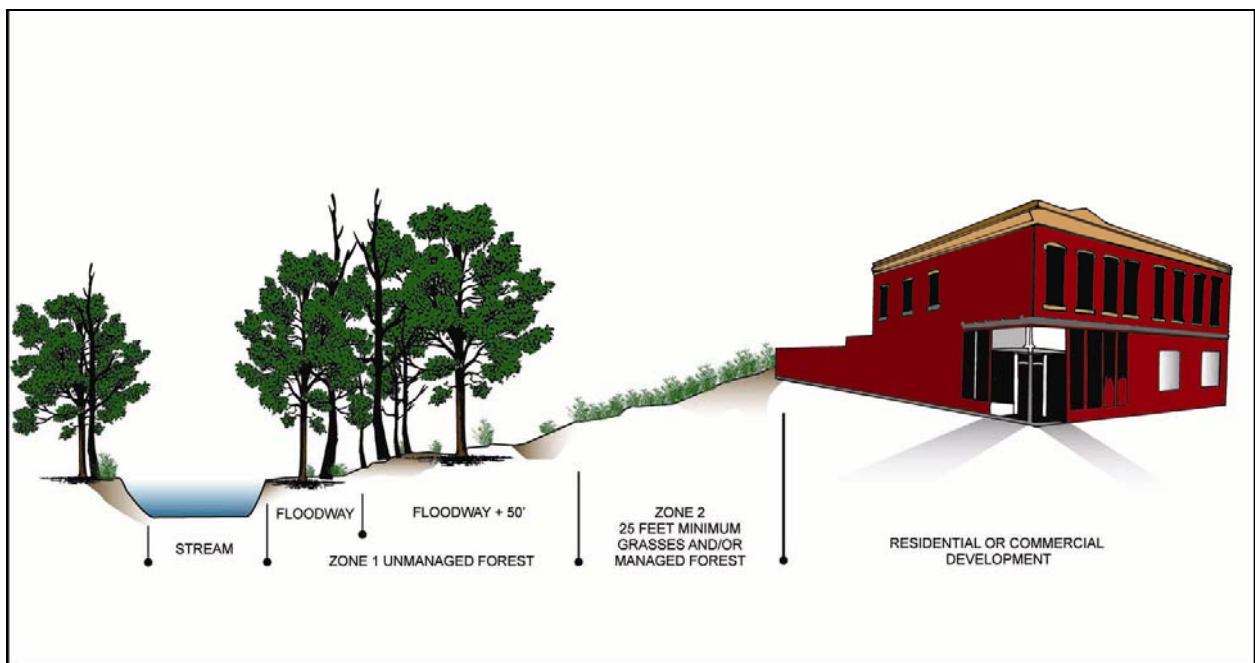
25' from the wetland delineation line (accepted by USACOE, TDEC, or MWS), with no disturbance allowed within the 25'.



**Figure 6-1 Buffer Example for Streams with Drainage Area < 100 acres**



**Figure 6-2 Buffer Example for Streams with Drainage Area  $\geq 100$  acres**



**Figure 6-3 Buffer Example for Streams with Floodways**



### 6.9.3 *Preservation of Water Quality Buffers*

Buffers shall be preserved both during development and perpetually after development.

1. During development, Zone 1 of all buffers shall be clearly marked and protected from construction activities. Zone 2 may be disturbed and revegetated.
2. For single family residential grading permits, water quality buffers shall be placed in open space / public utility and drainage easements.
3. Prior to the release of the Stormwater Bond or Stormwater Use & Occupancy Permit sign-off, water quality buffer limits shall be clearly marked with permanent signs placed every 100 feet along the outside edge of Zone 1 (the edge furthest from the stream). The number of required buffer signs should be indicated along the buffer line on the Grading and Drainage plans. Please contact MWS for the sign requirements.
4. Projects that disturb buffers for enhancement or restoration shall be allowed with prior approval from MWS.

When the application of the buffer area would result in the extreme loss of buildable area, modifications to the width of the buffer area may be allowed through the Stormwater Management Committee appeals process. An alteration to a community water also requires a variance from the Stormwater Management Committee. Septic systems cannot be located within 25' of a community water. This distance is not appealable to the SWMC. A variance will be required if they are located in Zone 1 outside of the 25' setback. Additional information on the variance process is found in Section 3.6 and Appendix F.

### 6.9.4 *Maintenance of Water Quality Buffers*

In order to maintain the functional value of the buffer area, indigenous vegetation may be removed as follows:

- a. Dead, diseased, or dying trees that are in danger of falling and causing damage to dwellings or other structures may be removed at the discretion of the landowner.
- b. Debris in the buffer area that is caused by storm damage may be removed.
- c. Invasive plant species may be removed if they are replaced by native species that are equally effective in retarding runoff, preventing erosion, and filtering nonpoint source pollution from runoff. A buffer restoration plan for removal of invasive species must be approved by MWS. See section 6.9.6 for buffer restoration plan requirements.
- d. Woody vegetation growing on a levee or within 15 feet of the levee toe may be removed to protect the integrity of the levee.
- e. Vegetation may be maintained in certain areas so as to not conflict with other Metro Code (i.e. Chapter 13 – Traffic and Parking) relating to “sight distances” for ROW, roadway maintenance, driveways, or other paths of travel.

### 6.9.5 *Uses in the Buffer that are Permissible with Conditions*

Some buffer impacts are inevitable with development. In order to minimize variance requests, Metro has identified allowable or permissible disturbances or uses of the buffer that can be approved at the staff level. Table 6-3 outlines permissible buffer impacts and the appropriate



conditions for each impact type. Impacts to the buffer that do not meet these conditions are required to request a variance.

The benefits of buffers are maximized in unbroken corridors along streams rather than in interrupted, segmented buffers. Therefore, the buffer program promotes minimizing stream crossings. For buffer crossings proposed in plans, the developer must show that there is not a feasible alternative to the crossing.

#### *6.9.6 Buffer Restoration and Enhancement*

Buffer restoration is required when a buffer is disturbed without approval from MWS or the Stormwater Management Committee. A developer or property owner may also wish to enhance a buffer to bring it closer to an optimal, undisturbed native forest condition. Prior to reestablishing or planting the buffer, a restoration or enhancement plan must be submitted to and approved by MWS.

##### *6.9.6.1 Buffer Restoration and Enhancement Plan Requirements*

Buffer restoration and/or enhancement plans must include the following:

1. *A drawing or plan* that shows the location of the buffer in relation to the existing or planned development and to the buffered community water; the disturbance limits for the planned buffer restoration; direction of flow of runoff from the site and flow within the community water feature; erosion prevention and sediment control measures to be installed to protect the community water; any existing or proposed stream crossings; existing or proposed streambank stabilization measures; access to a water source for the purposes of watering vegetation; and other pertinent information. The plan(s) must be stamped by a registered landscape architect.
2. *A plan in visual or narrative form that describes the vegetation plan for the buffer.* Zone 1 of buffers must be planted with native trees, shrubs, and grasses that will not be mowed. Please contact MWS for native plant lists. Zone 2 may be planted with fescue or Bermuda grasses, at a minimum, but can also be planted as described for Zone 1.
3. The schedule for when plantings will occur and a two (2) year survival guarantee provided by the responsible party.





**Table 6-3 Permissible Buffer Impacts, with Conditions**

Permissible Activities with Conditions	Stream Drainage Area < 100 acres  Zone 1 = 30'	Stream Drainage Area ≥ 100 acres  Zone 1 = 30' Zone 2 = 20'	Stream Drainage Area ≥ 1 sq mile  Zone 1 = floodway+50' Zone 2 = 25'	Wetland Buffers  Zone 1 = 25'	Pond Buffers  Zone 1 = 10' Zone 2 = 15'
Metro Greenways	Permissible with the following conditions: Minimize impacts to buffer based on Staff approval. Trails that do not require the removal of buffer vegetation and are made of mulch or other pervious materials are permitted.				
Wildlife and fisheries management	Permissible if activity is approved through TN Wildlife Resources Association or US Fish & Wildlife Service.				
Water dependent structures (boat docks, piers, marinas)	Permissible with the following conditions: Minimize disturbance and stabilize disturbed areas. Contain all pollutants related to boating activities such as oil and gas, boat sewage, solvents, antifreeze, detergents, and toxic metals.				
Driveway crossings	Not permissible except under the following conditions: At least 1,000 feet between crossings, three sided culvert or span is used and the width of the buffer impact perpendicular <sup>1</sup> to stream = road width + slope area over pipe (fill slope of 3:1 or flatter) + 10' from toe of fill on either side of crossing (for construction purposes)			Permissible when there are no other feasible alternatives	Permissible when there are no other feasible alternatives
Road crossings	Not permissible except under the following conditions: Only when there are no other feasible alternatives and at least 1,000 feet between crossings; three sided culvert or span is used and the width of the buffer impact perpendicular <sup>1</sup> to stream = road width + slope area over pipe (fill slope of 3:1 or flatter) + 10' from toe of fill on either side of crossing (for construction purposes)			Permissible when there are no other feasible alternatives	Permissible when there are no other feasible alternatives
Drainageway Improvements	Permissible with conditions: 1) necessary approvals from MWS and/or TDEC 2) with an MWS approved buffer reestablishment plan.				
Underground utility lines associated with new development <sup>1</sup>	Zone 1: Only when there are no other feasible alternatives; preferred crossing is perpendicular Zone 2: Permissible			Permissible when there are no other feasible alternatives	Permissible when there are no other feasible alternatives
<sup>1</sup> Crossings that are within 15 degrees of being perpendicular to the stream can be approved by staff without a variance. Proposed crossings that vary more than 15 degrees from perpendicularity must go through the Stormwater Management Committee.					