



Nine Mile Creek Discovery Point  
12800 Gerard Drive

Eden Prairie, MN 55346

(952) 835-2078

[www.ninemilecreek.org](http://www.ninemilecreek.org)

# MEMO

**TO:** Nine Mile Creek Watershed District Board of Managers  
**FROM:** Staff  
**DATE:** November 1, 2018  
**RE:** The District's Floodplain Rule

## Background

There has been some discussion recently regarding the interpretation of the language in District Rule 2.0, Floodplain Management and Drainage Alteration, specifically the language referencing the prohibition of fill *below the 100-year flood elevation*. Most recently, discussion has pertained to the Normandale Lake drawdown project and construction of the temporary water level control embankment just downstream of West 84<sup>th</sup> Street.

When considering water storage areas, there are two terms often used by the engineering community to describe the type and function of water storage: “dead storage” and “live storage” (see Figure 1). “Dead storage” volume is defined as the volume below the normal elevation (outlet) of a waterbody or stormwater management facility. In stormwater management facilities, the dead storage volume is used for water quality purposes by allowing for the settling/removal of sediment being transported in surface runoff. Over time the settlement of this sediment displaces a portion of the dead storage volume, typically open water, requiring periodic removal (typically every 20-25 years) for the water quality efficiency to be restored.

“Live storage”, also called flood storage, is the volume used for the detention (temporary storage) of stormwater and is the volume above the normal elevation (outlet) of a waterbody or stormwater management facility. Live storage is a calculated volume that determines the flood elevation used for management purposes. The District floodplain requirements are applicable to this live storage since any fill or encroachment will have an effect on the calculated flood elevation. Filling below the outlet of a stormwater facility does not have an effect on the storage volume that is considered in the calculation of a flood elevation for management purposes.

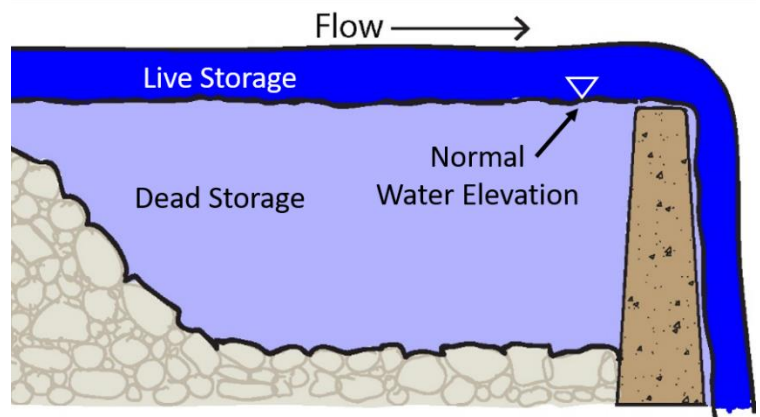


Figure 1. Schematic of dead storage and live storage in an impoundment.

The current District floodplain rule requires mitigation for any fill below the 100-year frequency flood elevation of the creek, water body or constructed stormwater facility, without distinction between dead storage and live storage.

Currently, rule 2.3.2 reads:

*Placement of fill below the 100-year flood elevation is prohibited unless fully compensatory storage is provided within the same floodplain and:*

- a at the same elevation +/- 1 foot for fill in the floodplain of a watercourse;*
- b at or below the same elevation for fill in the floodplain of a water basin.*

However, calculated flood elevations used for management purposes are a function of the “live storage” provided above the normal water elevation of a water body and do not consider dead storage volume. With live storage there is a bounce, or temporary rise in the water surface elevation while water is detained and then recedes back to its normal elevation. In reviewing projects that propose filling below the 100-year flood elevation, the filling and mitigation/compensatory storage should be based on the volume provided above the normal water surface elevation of a water body, live storage.

### **Request for Board Feedback**

We are requesting that the Managers consider an interpretive policy clarifying that it is the live storage that is applicable when reviewing projects related to the District’s floodplain rule. If so, staff will bring back a resolution formalizing the interpretive policy at the December board meeting.

When it is timely for a revision to the District rules sometime in the future, we will recommend that these definitions be highlighted or modified for clarity in the interpretation of the District’s floodplain rule.

At that time the future modified rule could simply be:

*Placement of fill below the 100-year flood elevation is prohibited unless fully compensatory flood storage is provided within the same floodplain and:*

- a at the same elevation +/- 1 foot for fill in the floodplain of a watercourse;*
- b at or below the same elevation for fill in the floodplain of a water basin.*

### **Future Board Considerations**

The following items are additional items for future consideration and discussion by the Board. It is recommended that a workshop with the Managers be scheduled for some time after the holiday to discuss these items in more detail.

- It is common practice for rip-rap to be installed at the outlet of storm sewer systems for energy dissipation. The District’s current rules would consider the placement of rip-rap below the flood elevation of the creek, water body or constructed stormwater facility “fill” requiring mitigation/compensatory storage to be provided. This typically is not feasible, because of limited property available, or practicable because of the small amount of volume reduction resulting from the placement of the rip-rap and resultant effect on the flood elevation of a water body. Currently, the placement of rip-rap would require a variance in the District’s floodplain rule should the compensatory storage not be provided. It is recommended that in the review of projects that propose rip-rap at the outlet of a storm sewer discharge for energy dissipation that the resultant fill be considered as an incidental impact to the reduction in flood storage of a water body.
- With the adoption of Atlas 14, the municipalities are seeing the impacts that the increase in precipitation frequency depths have on the stormwater infrastructure, especially the 100-year storm event management elevations. Many existing structures that have been built in accordance with past low floor requirements are now affected by the increase in the design precipitation amounts and the resultant calculated flood elevations. An often-considered solution to the problem is to move this increased amount of water downstream to the receiving waters, potentially having an effect on the management elevations downstream. To convey more water, this may be accomplished by increasing the size of the storm sewer for a given distance tying into

an existing conveyance system having sufficient carrying capacity or possibly increasing the size of the system to the systems outlet. Depending upon the scope of the improvement project, the current District floodplain rules may not apply to this type of an improvement.