DESKTOP ANALYSIS PROCEDURE DEVELOPED FOR ILLICIT DISCHARGE DETECTION AND ELIMINATION SCREENING

APPENDIX IDDE

In accordance with the conditions of its watershed-based municipal stormwater discharge permit, the Menomonee River Watershed Permittees, in collaboration with Milwaukee Riverkeeper, the Wisconsin Department of Natural Resources, and Southeastern Wisconsin Regional Planning Commission (SEWRPC), developed a desktop analysis procedure to identify those stormwater outfalls most likely to be conveying water contaminated with sanitary wastewater and prioritized those outfalls for dry-weather field screening.[1] This procedure is intended to evaluate all outfalls, regardless of size.

Screening is conducted using the matrix shown in Table IDDE.1 [Worldox 255203]. Each subbasin of the surface water system within a municipality's municipal separate storm sewer system (MS4) is screened for the likelihood that storm sewers are conveying water contaminated with sanitary wastewater. The subbasins are screened based upon the evaluation of a group of factors that give an indication of the likelihood of whether storm sewers within the subbasin are conveying contaminated water. For each factor, subbasins are given a rating of 1, 2, or 3, with 1 indicating a low potential for illicit discharge, 2 indicating a moderate potential for illicit discharge, and 3 indicating a high potential for illicit discharge. For a given factor, those subbasins where information is not available to assess the illicit discharge potential are given a rating or 2. The individual factor ratings are summed to yield a Human Illicit Discharge Potential (HDIP) raw score. This raw score is normalized by dividing it by the number of factors screened. The normalized HIDP scores can range between 1.0 and 3.0, with higher values indicating a greater potential for storm sewers in the subbasin to be conveying water contaminated with sanitary wastewater.

The procedure developed by the Menomonee River Watershed Permittees uses the following factors for Screening. The details of scoring are given in Table IDDE.1 [Worldox 255203]:

- The basin's history of complaints of discharges from outfalls in the subbasin and of outfalls with discharge occurring during dry-weather screening.

- The percentage of urban development within the subbasin that is greater than 50 years old. This factor is intended to identify basins with a high proportion of older infrastructure which may be degrading. It can be assessed using the SEWRPC historical urban growth mapping layer. An

[1] *The Menomonee River Watershed Permittees consist of the Cities of Brookfield, Greenfield, Milwaukee, West Allis, and Wauwatosa; the Villages of Butler, Elm Grove, Germantown, Menomonee Falls, and West Milwaukee; and Milwaukee County.*

alternative means of assessing this would be to use the ages, if known, of sanitary and storm sewer pipes in the subbasin.

- The average condition of sanitary sewer pipes in the subbasin, based upon the National Association of Sewer Service Company's rating system for pipe inspection.

- The proximity of sanitary sewer and storm sewer pipes to one another. This would be assessed by the average density of crossings of sanitary and storm sewer pipes within the basin. In addition, each eight-foot section in which these pipes are adjacent to and within four feet of each other would be counted as a crossing. The number of crossings is divided by the area of the subbasin.

- The density of parcels in the subbasin. This serves as a surrogate for the number of sanitary sewer laterals within the subbasin. The number of parcels within the subbasin is divided by the area of the subbasin.

In addition to these factors, the matrix allows for the inclusion of an optional screening factor. This is intended to allow municipalities to take other factors for which data are available into account. Examples of factors that could potentially be used include the percent exceedances of recreational use water quality criteria in the locations in the surface water system where the subbasin discharges, presence of fecal indicator bacteria hot spots in the subbasin, or the level of fecal indicator bacteria load reductions assigned to a subbasin through a total maximum daily load (TMDL) study.

The normalized HIDP score is used to prioritize outfalls for field screening. The Menomonee River Watershed Permittees suggest that outfalls within subbasins having normalized HIDP scores greater than 2.5 be given high priority for field screening, while those in subbasins with normalized HIDP scores between 1.5 and 2.5 be given medium priority and those in subbasins with normalized HIDP scores less than 1.5 be given low priority for field screening. While they recommend that the final rank for field screening be based upon normalized HIDP scores, the ranking can also be adjusted to account for issues such as the proximity of outfalls to current or future capital construction projects, available funding, and neighborhood concerns. They also note that, if the necessary additional data are available, a second round of desktop screening could be conducted to prioritize storm sewersheds within subbasins for screening.

It should be emphasized that this analysis procedure is intended to be used to prioritize storm sewer outfalls for field screening. It is not intended as a substitute for field screening or other in-depth analyses.

#255203 – CAPR-330 Table IDDE.1 Prioritization Matrix for Outfall Screening
300-4010
JEB/LKH/mid
10/1/20, 6/8/21

Table IDDE.1
Matrix for Prioritizing Drainage Areas for Outfall Screening Using Screening Factors for Illicit Discharge Potential of Human Waste

SEWRPC Subbasin	Past Discharge Complaints or Flowing Outfalls During Dry Weather (Rating)[a]	Age of Development (Rating)[b]	Material/ Condition of Pipes (NASSCO Ratings)[c]	Proximity of Sanitary and Stormwater Pipes[d]		Subbasin Area (square miles)	Parcels per Square Mile[e]		Optional Indicator (Rating)[f]	HIDP Raw Score[g]	Normalized HIDP Score[h]	Comments	Final Rank[i]
				Density of Crossings	Rating		Density	Rating					

[a] *If there have been complaints of discharges or past detections of dry-weather flow from outfalls in the subbasin, rate as 3. If there have not been complaints of discharges or past detections of dry-weather flow, rate as 1. If this is not known, rate as 2.*

[b] *Rate subbasins in which less than 30 percent of the area is 50 years old or older as 1. Rate subbasins in which in which 30 to 60 percent of the area is 50 years old or older as 2. Rate subbasins in which over 60 percent of the area is 50 years old or older as 3.*

[c] *Material/condition of pipes is based on NASSCO* ***(National Association of Sewer Service Company)*** *ratings for sanitary pipe inspection. Where average pipe condition in a subbasin receives a NASSCO rating of good or excellent, rate as 1. Where average pipe condition in a subbasin receives a NASSCO rating of poor or needs immediate attention, rank as 3. Where average pipe condition in a subbasin is not known, rate as 2.*

[d] *Rating is based on the density of crossings of sanitary and storm sewer pipes in the subbasin. Count all of the pipe crossings in the area. Where sanitary and sewer pipes are within four feet of each other (center to center), count each eight-foot section of pipe as a crossing. Rank all subbasins based on the number of crossings divided by the area of the subbasins. Subbasins in the lowest 25th percentile of crossing density are rated 1, subbasins in the 25th through 75th percentile of crossing density are rated 2, subbasins in the upper 25th percentile of crossing density are rated 3.*

[e] *Rating is based on parcel density which is calculated by dividing the number of parcels in the subbasin by the area of subbasin. Subbasins in the lowest 25th percentile of parcel density are rated 1, subbasins in the 25th through 75th percentile of parcel density are rated 2, subbasins in the upper 25th percentile of parcel density are rated 3.*

[f] *The optional factor is included to prioritize subbasins based upon available water quality data. This could be based upon data such as percent exceedance of water quality criteria for fecal indicator bacteria, TMDL reduction priorities, or other indicators. Subbasins in the lowest 25th percentile of the indicator are rated 1, subbasins in the 25th through 75th percentile of the indicator are rated 2, subbasins in the upper 25th percentile of the indicator are rated 3.*

[g] ***HIDP (Human Illicit Discharge Potential)*** *raw score is the sum of ratings for past discharge complaints, age of development, material/condition of pipes, proximity of sanitary and storm sewer pipes, parcels per square mile, and the optional indicator, if it is used.*

[h] *Normalize the raw HIDP scores by dividing the raw score by the number of screening factors assessed. This normalization produces scores that fall onto a standard scale of 1.0 to 3.0 for low to high illicit discharge potential, respectively. The suggested scale for prioritization for field screening is subbasins with normalized HIDP scores between 1.0 and 1.5 are low priority for screening, subbasins with normalized HIDP scores greater than 1.5 to 2.5 are medium priority for field screening, and subbasins with normalized HIDP greater than 2.5 are high priority for field screening.*

[i] *The final rank will take normalized HIDP score into account, but may also include other factors such as proximity to capital construction projects, available funding, and neighborhood concerns.*

Source: Menomonee River Watershed Permittees, Milwaukee Riverkeeper, and SEWRPC.