

Greene County, Missouri

Municipal Separate Storm Sewer System (MS4)

Permit # MO-R040014

Storm Water Management Plan (SWMP) 2017



Storm Water Management Plan

TABLE OF CONTENTS

Introduction	3
Special Conditions for Total Maximum Daily Loads	4
Monitoring Program Summary	4
MCM 1: Public Education	15
MCM 2: Public Participation and Involvement	22
MCM 3: Illicit Discharge Detection and Elimination.....	31
MCM 4: Construction Site Storm Water Management.....	39
MCM 5: Post-Construction Storm Water Management	45
MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations	50
Monitoring, Record Keeping, and Reporting.....	56
References	57
Appendices	59

LIST OF FIGURES

Figure 1: Sampler at Site #3 on Ward Branch	5
Figure 2: Total Nitrogen 2009-2016	6
Figure 3: Total Phosphorus 2009-2016	7
Figure 4: Total Suspended Solids 2009-2016	9
Figure 5: Nutrient Concentration vs. TSS for 2009-2016 Storm Event Samples.....	9
Figure 6: TP Load duration Curve for Site 7	11
Figure 7: JRBP Watershed Festival	15
Figure 8: Continuing Education Class at the Watershed Center	15
Figure 9: Macroinvertebrate Collection during a Field Trip at the Watershed Center	17
Figure 10: On-Site Wastewater Installer Class at the Training Center	19
Figure 11: On-Site Wastewater System Handout.....	20
Figure 12: Total Nitrogen Data from IP Database	25
Figure 13: Environmental Priorities Task Force Meeting	27
Figure 14: Lateral Line Installation Inspection	32
Figure 15: Homeowner's Class at the Wastewater Training Center	32
Figure 16: Outfall Screening Location	33
Figure 17: Construction Site BMPs.....	40
Figure 18: Greene County Stormwater Engineer Plan Review.....	41
Figure 19: Extended Dry Detention Basin	45
Figure 20: Trash-Filled Sinkhole Collapse	47
Figure 21: Stable Sinkhole Depression	47
Figure 22: Vehicle Repair Bays	51
Figure 23: Cold Mixing Asphalt	51
Figure 24: Vehicle Wash Bay Grit Separator Cleaning	51
Figure 25: Street sweeping truck	51
Figure 26: Clifton Facility Salt Storage Barn	51
Figure 27: Clifton Facility Petroleum Storage.....	53

STORMWATER MANAGEMENT PROGRAM

INTRODUCTION

This Storm Water Management Plan (SWMP) is submitted as partial fulfillment of the requirements set forth in Greene County's Municipal Separate Storm Sewer System (MS4) permit (MOR040014) issued by the Missouri Department of Natural Resources (MDNR) on January 15, 2017.

It is the intention of Greene County to comply with all aspects of the MS4 permit. Greene County already has programs and regulations in place that meet the requirements of the six minimum control measures which are set forth in the general permit. Greene County has a long history of protecting our water resources long before being required to do so by the MS4 program. Greene County has had a program in place for construction site stormwater runoff control since 1991. Our cooperation with and support for local non-profit organizations enables our public education program to reach exponentially more people than we otherwise could.

In order to fully comply with the terms of the permit, it is our intention in this submittal to:

1. review our existing program
2. update our SWMP document as required in Section 4 of the general permit, and
3. identify areas where new or additional programs or requirements will be needed to satisfy any new permit requirements.

This document lists the SWMP requirements of the general permit, provide a description of the County's current programs and identify additional activities or requirements which will be needed to comply with the terms of the general permit. Development, review, and updating of the SWMP is primarily the responsibility of the Greene County Environmental Compliance Manager. Each of the six minimum control measures (MCMs) is primarily the responsibility of the Environmental Compliance Manager with the support of the Greene County Planning and Zoning Division, the Greene County Building Regulations Division, the Greene County Highway Department, and various partner organizations such as the Watershed Committee of the Ozarks (WCO), James River Basin Partnership (JRBP), and the Ozarks Environmental Water Resources Institute (OEWRRI).

Prepared By: Greene County Resource Management Department

Cover Photo: Students on a field trip to the Watershed Center learn the erosion process during a stream table demonstration

GENERAL PERMIT REQUIREMENTS FOR SWMP

Special Conditions for Total Maximum Daily Loads

Section 3.1.1 of the general permit requires “Any regulated MS4 identified in an United states Environmental Protection Agency (EPA) approved or established Total Maximum Daily Load (TMDL) with an applicable Wasteload Allocation (WLA) shall implement steps toward the attainment of applicable WLA in accordance with 40 CFR 122.44(k)(2) and (3).

Some of the storm water discharge from the regulated urbanized areas of Greene County does enter water bodies for which there is an EPA approved TMDL. These water bodies include the James River and the Little Sac River. TMDL’s are included in Appendix A. However, neither of these TMDL’s contain WLA’s for non-point sources or regulated MS4 communities. We are therefore not required to develop and submit a TMDL Assumptions and Requirements Attainment Plan (ARAP).

Although Greene County is not required to develop an ARAP for the two existing TMDL’s under the current permit, we have taken steps under the previous two permits to monitor several tributaries to the James River. A cooperative monitoring effort among five cities and two counties has been in place since 2008. Water quality data has been collected since 2009 to determine any observable trends in stormwater quality and to comply with previous permits. Under the current permit we will modify and continue our water quality sampling program.

Monitoring Program Summary

Greene County’s monitoring program has included storm event sampling of at least 4 storm events per year at 8 in-stream sites (see map in Appendix A) and base flow sampling once per year at 3 or 4 sites that typically have perennial flow (most streams in the region, including most of our sampled streams, are classified as losing streams and do not have perennial flow). This monitoring regimen is required to assess compliance with in-stream target concentrations of 1.5 mg/L for total nitrogen (TN) and 0.075 mg/L total phosphorus (TP) found in the James River TMDL. These target nutrient concentrations are distinct from WLA’s because no annual discharge loads have been assigned to identified contributors of the nutrients of concern. The County contracts with the Ozarks Environmental Water Resources Institute (OEWRI) at Missouri State University for sample collection and laboratory analysis.

The first flush storm event samples are not representative of storm water contributions over the entire storm event, but the rising limb of the hydrograph where pollutant concentration is likely to be highest. Rather than an event mean concentration, the first flush samples are taken as one way to try to assess potential stormwater runoff influences on in-stream water quality conditions. The number of samples that can be collected annually per site is limited by the intensity and duration of the event, the spatial distribution of the rainfall event as well as the size and characteristics of the watershed. Most storm events do not distribute rainfall across the monitored watersheds such that all samplers are submerged.

Nitrogen

Figure 2 displays the total nitrogen (TN) geometric mean concentrations for all samples (storm events and baseflow) for the entire sample period from 2009-2016. At the site 6 sample point in the watershed the James River has both agricultural influences from the upper watershed including tributaries such as Turner Creek, as well as urban influences from tributaries such as Pearson Creek. Above site 6 are approximately 2,800 acres of regulated MS4 area in the lower portion of the Pearson creek watershed (a tributary to the James). The rest of the watershed's 629 km² (155,429 acres) is almost entirely rural. The size of the James River watershed above Pearson Creek attenuates the impact of Pearson Creek and the mix of influences makes it difficult to pinpoint specific causes of nitrogen loading. The geometric mean TN concentrations in baseflow on Pearson Creek is 2.29 mg/L over the entire sampling period from 2009-2016. This concentration is very similar to, and only slightly less than, the geometric mean storm event concentration of 2.65 mg/L (Figure 2). Ongoing research by OEWRI suggests that high TN concentrations in groundwater may be a significant source of TN in surface water as spring samples tend to show a spike in TN and concentrations decreasing further downstream from the spring (OEWRI, personal communication).

Pearson creek is a heavily karst stream with losing reaches and many gaining reaches with springs. Were it not for the contribution from multiple springs, Pearson Creek would not have baseflow. The possibility of a groundwater influence on TN can complicate the ability to identify the specific pollutant source since the groundwater can come from multiple locations miles away and can come from sources outside the surface watershed. Dye traces at Jones Spring have indicated recharge areas within the City of Springfield that are outside the surface watershed. This could result in pollutant sources from industrial areas, leaking sewer pipes, or from residential fertilizers within the City of Springfield that would not otherwise be indicated if only the surface watershed were considered. It could also be possible that fertilizer and septic systems could be leaching nitrogen into the groundwater since nitrogen is usually highly soluble while the phosphorus associated with those pollutant sources is bound onto the clay, iron, and aluminum binding sites in the soil. Additionally, any TP bound onto suspended solids would have ample time to settle out in the groundwater system. Although mostly rural, Pearson Creek does have some urban influences from the Cities of Springfield and Strafford, both of which are regulated MS4 communities. Approximately 4800 acres (33%) of Pearson Creek's 14,500 acre watershed is located within either the census-defined urbanized area or the city limits of Strafford or Springfield, although GIS ground cover analysis classifies only 17% of the Pearson Creek watershed as urbanized. In Greene County's regulated MS4 area within the Pearson Creek watershed, the urbanization is mostly large (>3 acre) tract residential housing. High TN concentrations in storm events could be the result of fertilizer coming into the MS4 from agricultural activities or lawn fertilization, failing on-site wastewater systems (OWS), or from eroding stream bank material. Since Pearson Creek's banks are relatively stable, bank erosion is likely a less important source of nitrogen than in other watersheds, but may be a source



Figure 1: Sampler at Site #3 on the Ward Branch

Sampling Methods

A modified version of *in situ* water samplers used by the United States Geological Survey is used in channels where applicable. Analysis is performed for six water quality parameters; total nitrogen (TN), total phosphorus (TP), chloride, specific conductivity, pH, and total suspended solids (TSS).

of TP. Pearson Creek consistently has higher TN concentrations and has the highest geometric mean TN concentrations when the entire sampling history (2009-2016) is included.

Turner Creek (Site 10) has the second highest geometric mean TN concentration (2.23 mg/L) when the full sample history is considered and has the highest baseflow TN concentration of 2.54 mg/L for the period of 2009-2016 (Figure 2). Turner Creek has higher TN concentrations in baseflow than found in storm events. Only the Ward Branch (site 3) shows a similar trend. As discussed above, groundwater contributions of TN could have an influence on Turner creek at baseflow since there are many springs in the watershed. Agricultural fertilizer application and cattle access to streams could also contribute TN to the stream at baseflow, as could bank erosion from previous stream alterations. Only 3.3% of Turner Creek's approximately 6,300 acre watershed can be classified as urbanized based on GIS analysis of the groundcover in the watershed. The watershed is completely outside the urbanized, regulated MS4. As evidenced by historic aerial photography and conversations with landowners, much of the creek has been altered in the past. The TN source for Turner Creek could also be streambank erosion from poor riparian corridor preservation that can release historical deposits of nutrient laden sediment, but this is the more likely an important source of TP.

The Ward Branch (Site 3), although different from Turner Creek in that it is 71% urbanized, also has baseflow TN concentrations which are higher than in storm events (Figure 2). The Ward Branch, like Turner Creek, would not have baseflow were it not for the influence of springs. Since this watershed is highly urbanized (71% urban) it is likely there are non-stormwater related point sources contributing nitrogen between storm events. Sources such as leaking septic systems or exfiltration from older sewer lines in the area might be contributing TN, however, this site show the lowest geometric mean concentration of TP for baseflow samples as well as the lowest geometric mean for storm event samples. The low TP concentrations in baseflow does not support failing septic systems or leaking sewers as a likely nutrient source. It is important to note that unlike phosphorus (see discussion below) the TN concentrations for baseflow are very similar to the TN concentrations measured during storm events. This could indicate land-use associated sources that are widespread enough that they are not quickly diluted by storm flow.

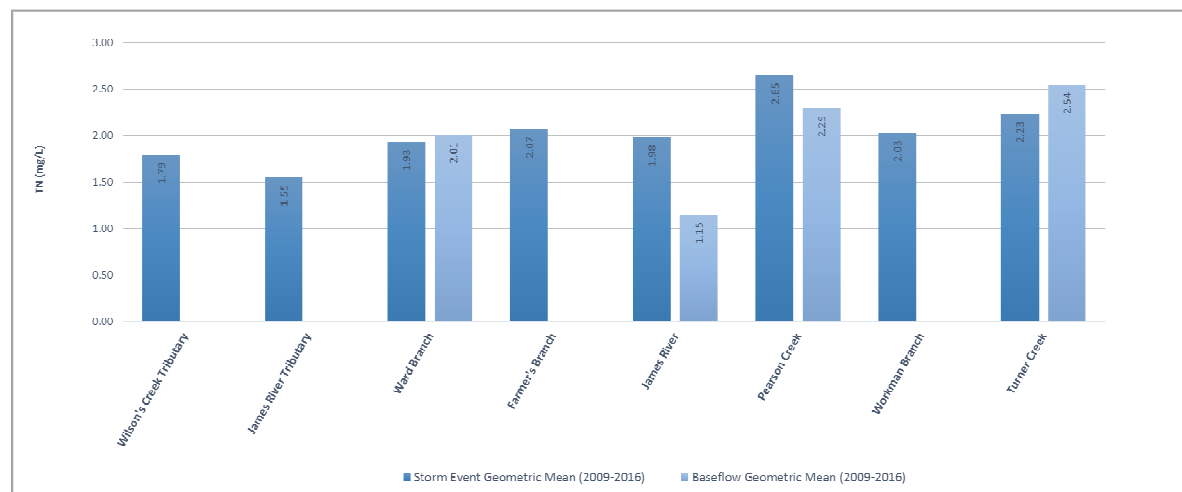


FIGURE 2: TOTAL NITROGEN 2009-2016

Four sites typically have perennial flow sufficient to collect base flow data (Figure 2) depending on time of year and antecedent rainfall conditions. These sites are the Ward Branch (site 3), The James River at Kinser Bridge (site 6), Pearson Creek (site 7), and Turner Creek (site 10). Sites 6 and 7 have geometric mean baseflow TN concentrations similar to, but lower than the geometric mean stormwater concentrations (Figure 2). As discussed above, sites 3 and 10 have baseflow TN concentrations with a higher geometric mean than the storm flow geometric mean.

Phosphorus

As detailed in above in the discussion on Nitrogen, the watershed for the James River above site 6 at Kinser Bridge has very little influence from the regulated urbanized MS4 area. Above site 6 are approximately 2,800 acres of regulated MS4 area in the lower portion of the Pearson creek watershed (a tributary to the James). The rest of the watershed's 629 km² (155,429 acres) is almost entirely rural and/or outside of Greene County. The size of the James River watershed above Pearson Creek attenuates the impact of Pearson Creek and the mix of influences makes it difficult to pinpoint specific causes of phosphorus loading. The geometric mean TP concentration of baseflow samples for the entire sample period from 2009-2016 for all sites is below the 0.075 mg/L eutrophic threshold (ET) in-stream TP target in the effective James River TMDL.

It is important to note that many sites have had storm event TP concentration samples that were close to or below the 0.075 mg/L ET. These data indicate a wide range in concentrations over a wide range of flow regimes. The geometric mean TP concentrations for all sites where baseflow samples can be collected is well below the ET target set by the TMDL (Figure 3).

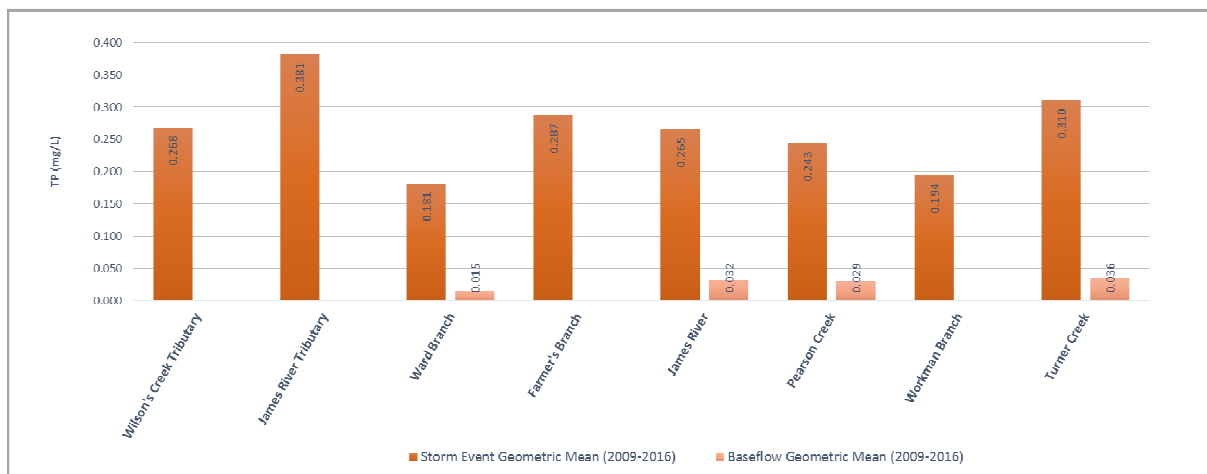


FIGURE 3: TOTAL PHOSPHORUS 2009-2016

Storm event TP concentrations are an order of magnitude higher than the baseflow concentrations, but samples are collected at the time in the storm event (the first flush) when maximum pollutant concentrations would be expected.

The most likely source of phosphorus for storm events in the Pearson Creek watershed is agricultural activity, failing onsite wastewater systems (OWS), and/or bank erosion. TP is often associated with sediment in streams as it is more easily adsorbed onto soil particles and less likely to be in dissolved form. The correlation matrix for Turner Creek indicates a moderate, but statistically insignificant relationship between TSS and TP, indicating some of the TP may be from bank erosion. In addition to having the highest geometric mean TN concentration, Turner Creek (site 10) has the highest geometric mean TP concentration followed closely by the James River tributary at Rivercut (site 2) when all storm events on record are included (Figure 3).

The correlation matrix shown in Table 1 shows no significant correlation between TP and TSS when data from all sites is considered over the entire seven year data collection period. Typically phosphorus is associated with sediment since it is more easily adsorbed or bound onto soil particles. Since TP concentration is typically an order of magnitude lower in baseflow samples than storm samples (Figure 3) it is likely that the main source of the TP is suspended load during storm events. However, only Ward Branch (site 3) and Workman Branch (Site 9) show a strong correlation between TP and TSS ($R=0.77$ and 0.83 , respectively) but the relationship is not statistically significant. Interestingly, Workman Branch is a tributary to Ward Branch. No other site shows a strong correlation and for some, like sites 1 and 10 (James River Tributary and Turner Creek, respectively) show a slightly *negative* correlation between TP and TSS in storm event samples when the entire sampling record from 2009-2016 is analyzed.

Total Suspended Solids

TSS is not significantly correlated with either TN or TP when analyzed for each individual site and for all data over the seven year data collection period (See Table 1).

The geometric mean concentration of TSS for each site for all storm events and baseflow samples from 2009-2016 is shown below in Figure 4. The James River (site 6) has a higher geometric mean TSS concentration for all samples than any other site, followed by the Ward Branch (Site 3). Turner Creek has some of the lowest TSS concentrations during baseflow, but during storm flows the banks are highly susceptible to erosion. Turner Creek was channelized decades ago and is re-adjusting the channel geometry to fit the slope and sinuosity the channel needs. The resulting bank erosion has been a concern to some landowners in the watershed. A study along Ward Branch by OEWRI in 2006 determined that a single eroding bank 740 feet long was contributing 1,499 cubic feet (98 tons) of fine grain sediment into the stream annually (OEWRI, 2006). When multiplied out over a much larger disturbed watershed, the sediment contribution from eroding banks alone can be tremendous.

When the data from all sites is combined there is little correlation among TN, TP and TSS (Figure 5 and Table 1). The logarithmic scale used in Figure 5 allows for ease of visually communicating wide ranging data sets, but the trend line for TP v. TSS gives a greater visual impression of a positive correlation than is warranted by the resultant coefficient of determination (R^2) of 0.32 which is not high enough for statistical significance of 95% confidence. On an individual basis only two sites show a slight, but not statistically significant correlation between TSS and nutrient concentration in storm samples. Pearson Creek is the only site with even a moderate Pearson Correlation Coefficient between TN and TSS ($R=0.88$). The Pearson Correlation Coefficient (R) between TP and TSS for Workman Branch (site 9) is 0.83 . Other sources of TP, beside sediment must be influencing many of these sites for the correlation

with TSS to be so low. Much of the TSS data depends on the flashiness of the rise and antecedent moisture conditions. Slower rises can lead to lower TSS concentrations and therefore less correlation with nutrients. Flashier rises can have higher TSS concentrations and can skew nutrient correlation with TSS.

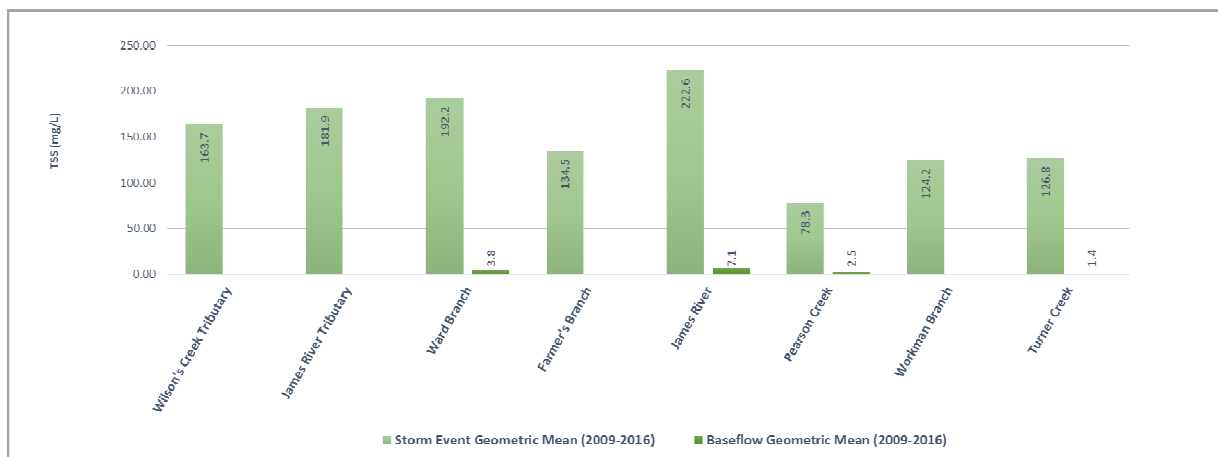


FIGURE 4: TOTAL SUSPENDED SOLIDS 2009-2016

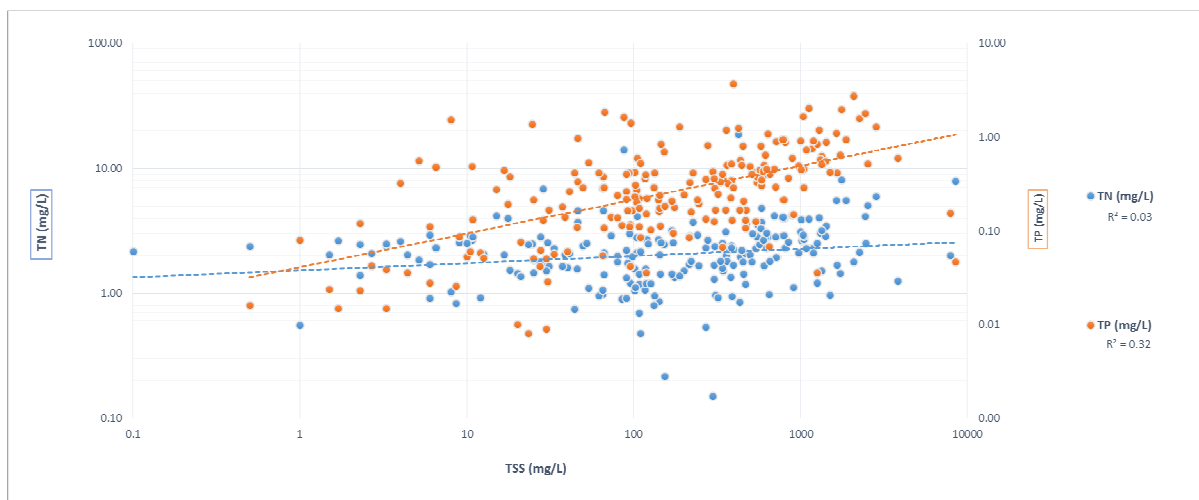


FIGURE 5: NUTRIENT CONCENTRATION V. TSS FOR 2009-2016 STORM EVENT SAMPLES

	<i>TN (mg/L)</i>	<i>TP (mg/L)</i>	<i>Cl (mg/L)</i>	<i>SC (uS/cm)</i>	<i>pH</i>	<i>TSS (mg/L)</i>
<i>TN (mg/L)</i>	1					
<i>TP (mg/L)</i>	0.32	1				
<i>Cl (mg/L)</i>	0.02	-0.17	1			
<i>SC (uS/cm)</i>	0.01	-0.24	0.61	1		
<i>pH</i>	0.06	0.06	0.10	-0.05	1	
<i>TSS (mg/L)</i>	0.24	0.23	-0.11	-0.14	0.01	1

**TABLE 1: PEARSON CORRELATION COEFFICIENT (R)
FOR ALL STORM EVENT SAMPLES (2009-2016)**

Chloride (Cl) and Specific Conductivity

Over the seven year data collection period the chloride concentrations for all sites ranged from 0 to 262.4 mg/L. These values are well below the chloride criterion of 860 mg/L for protection of aquatic life. When data for all sites is analyzed over the entire sampling period (2009-2016) there is a slightly positive correlation between specific conductivity and chloride concentrations, but this relationship is not significant. Cl concentrations are low enough that no significant seasonal trends can be distinguished. Baseflow Cl concentrations do not differ significantly from stormflow.

Nutrient Concentration Trends in Storm Event Data

With such a short record of data from only eight sites the number of data points available does not yield a sample size large enough to see any statistically significant (95% confidence) trends in the nutrient concentration data. TN and TP concentrations by date have been tracked and graphed throughout the entire sampling history. Regression lines and equations are included for each plot along with the coefficient of determination (R^2) to determine the statistical significance of the trend (how likely the trend is not due to chance). Although some of the nutrient concentrations in the charts visually appear to have an increasing or decreasing trend, none of the trends have a coefficient of determination (R^2) for the linear regression line high enough (0.95 or greater) to conclude that the apparent trend is due to any variable other than chance.

Although all storm event nutrient concentrations are higher than the baseflow concentrations (TP concentrations for instance can be an order of magnitude greater), they are collected on the rising limb of the hydrograph at the time in the storm event where peak pollutant concentrations would be expected and do not represent the pollutant load concentration for all flow volumes experienced during a storm event. A recent study by OEWRI on Pearson Creek concluded that the flow-weighted average TP concentration at site 7 on Pearson Creek was 0.073 mg/L, which is below the ET in-stream target established by the TMDL. The load-duration curve developed by OEWRI shows that the ET of 0.075 mg/L is exceeded only during the very highest flows (5% exceedance) and at very low flow (95% exceedance). During most flow regimes, the TP concentration is less than the in-stream target in the James River TMDL (Figure 6) (OEWRI, 2014).

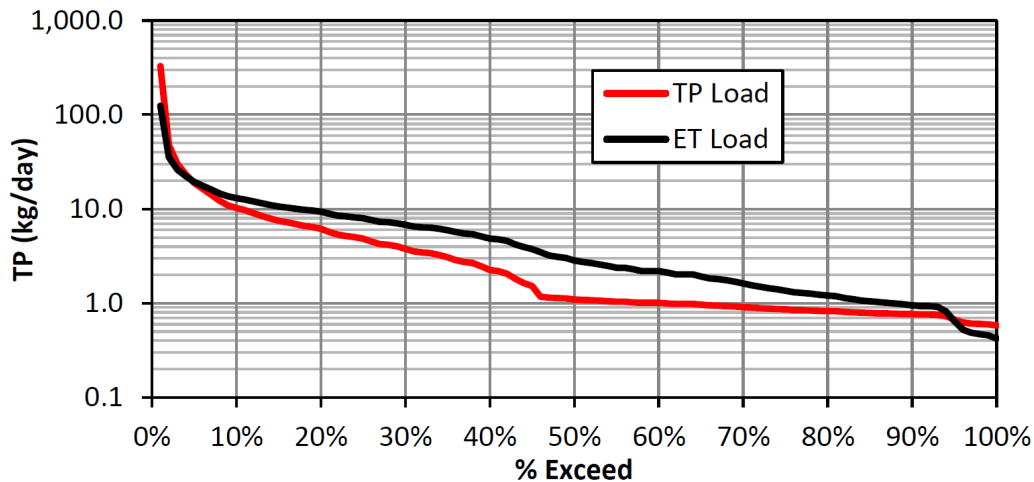


FIGURE 6: TP Load Duration Curve for Site 7 (OEWR, 2014)

Summary and Future Sampling

The sampling done over the last 8 years has captured the variability in stormwater nutrient concentrations in multiple watersheds in Greene County. The variability suggests multiple sources of pollutants that cannot be separated out by correlation. The sampling has captured a picture of water quality at one specific flow rate (rising limb at a specific water depth) on multiple streams. Although the data collected has helped to characterize nutrient concentration variability for a specific discharge rate on the sampled streams it is not sufficient to estimate nutrient loads. Further sampling under the current sampling design is not likely to yield enough data to enable nutrient trends to be identified with any statistical significance.

Although the current permit does not require Greene County to continue our existing monitoring program for compliance with the James River TMDL, we do not intend to cease nutrient data collection. It is our expectation that in the near future EPA will begin the process of issuing new TMDL's for both Pearson and Wilson Creeks. The TMDL's based on stormwater runoff volume for Pearson and Wilson's Creeks that were issued and approved by EPA in January 2011 were vacated by the EPA in response to a legal challenge by the City of Springfield. Part of the agreement was that EPA would consult with the City of Springfield (and hopefully Greene County as well) to collectively craft a reasonable, achievable TMDL based on local data. These stream are on the 303(d) list of impaired waters for aquatic life protection, and whole body contact. The listed pollutants are E.coli, PAHs and unknown pollutants.

Because it is important to identify and quantify the pollutants to be regulated by a TMDL using sound data, we intend to change the sampling program for this permit period and focus on one stream, Pearson Creek. Pearson Creek has a United States Geological Survey (USGS) stream gage at Farm Road 148 (old Sunshine). Throughout this current permit the County's sampling methodology will be to collect water sample at one point on Pearson Creek, near the existing gage. Samples will be collected every week at the same time regardless of flow rate in Pearson Creek. The current sampling protocol will be followed with the addition of E.Coli analysis. By sampling near the gage location and utilizing the flow rates in the Hydraulic Engineering Center-River Analysis System (HEC-RAS) model generated for the

County's new flood risk maps, we can collect samples at a single site and know exactly what that flow rates are at the time of sample collection. Sampling over a wide range of flow rates will allow us to develop a very accurate load duration curve and mean annual nutrient and bacteria (E.Coli) loads

Nutrient load data are also needed to inform the Multi Criteria Decision Analysis (MCDA) tool as part of the Integrated Planning (IP) process for prioritizing local environmental protection efforts. The MCDA tool has been developed as a way of determining which pollutants and pollutant sources are having the greatest impact on the region's environmental resources (water, air, and land). Determining the nutrient loading of Pearson Creek can help determine if nutrient reduction should be a higher or lower priority in the watershed.

Even though Greene County is not required to submit an ARAP we will continue the existing programs for construction site runoff control, discussed in Section 4.2.4, which we feel are effective to the maximum extent practicable in reducing the non-point loading of nutrients from our small MS4. Dissolved nutrients and nutrients adsorbed onto colloidal soil surfaces can be released to waterways when sediment leaves a construction site. Our construction site runoff control regulations are an important component in efforts to achieve TMDL in –stream targets. As a result of the Fulbright Spring Protection Study completed in 1996, Greene County adopted requirements for permanent structural post-construction water quality BMPs in the Fulbright Spring and Pearson Creek watersheds. Requirements for these BMPs are included in Section 115 of the Stormwater Design Standards (Appendix D). In January 2006 the County Commission voted to extend the post-construction water quality BMP requirements to all watersheds in Greene County (See Planning Board Case 1625, Appendix D). These BMPs are designed to allow more settling of suspended loads in stormwater and to increase hold times within detention structures to increase infiltration, all of which helps reduce the amount of sediment which is a major source of phosphorus.

There are many actions that we would like to be able to take to be able to reduce nutrient loading in the James River, but are currently limited in our ability to do so. Research by Missouri State University shows that stream bank erosion contributes .052 lbs of phosphorus per cubic foot of fine grained material that is eroded into the stream (OEWR, 2007). Much of the non-point load of sediment bound phosphorus is coming from outside the MS4 regulated boundary, or even outside of Greene County in the case of the James River via stream bank erosion. Other local research has found that a single 7.4 km (4.6 miles) long reach of the James River has contributed 20,000 Mg (22,046 tons) of fine-grained sediment into the river from 1997-2008, or 2,017 tons per year and that bank erosion accounts for 16%-50% of the suspended load in the James River (Kuehn, 2015). The Integrated Planning Process and the MCDA will help to determine if streambank erosion needs to be a higher priority for pollution prevention. If the MCDA identifies streambank erosion as a high priority, our long range goal would be to engage with landowners in the watershed (specifically agricultural producers) to improve practices such as increasing stream buffers, livestock exclusion, etc. We already partner with the Watershed Committee of the Ozarks and the James River Basin Partnership (as discussed in Section 4.2.1.1.2) for education of landowners in the watershed about these types of practices. However, to see significant implementation of these conservation practices the education must be coupled with incentives which will require a permanent and significant source of revenue. Until that revenue is secured we will have to limit our efforts to education of landowners both within and outside the MS4 regulated area. The

Integrated Planning Process and the MCDA will help to determine if streambank erosion needs to be a higher priority for pollution prevention. As part of the Integrated Planning approach (discussed in detail in section 4.2.2.1.4) the MCDA looks at multiple pollutant sources. By weighting the sources based on community priorities the significance, and scale of the pollutant source an “apples-to apples” normalized comparison can be made among pollution sources to determine which one should be a priority for the community (City of Springfield, Greene County, and City Utilities) to address. The MCDA relies on inputs of accurate water quality data which our proposed sampling change will help provide.

Even though Greene County is not part of a WLA for the existing James River TMDL, we do have in place the regulations outlined below that provide the authority for requiring the best management practices described in this document that been implemented which address the pollutants in the James River TMDL (TN and TP) and constitute the framework for the BMPs used by Greene County.

- Zoning Regulations Article IV, Sections 25, 27 and 28 (Appendix B)
 - Section 25 requires detention facilities for all new development and redevelopment projects to decrease flooding and increase capture of pollutants such as sediment, metals and nutrients
 - Section 27 requires sediment and erosion control practices to be implemented on all land disturbance projects within Greene County including permit requirements, inspections and enforcement measures to prevent sediment and sediment-borne pollutants such as nutrients and metals from entering waters of the state.
 - Section 28 regulates the use, including grading and filling, of sinkholes which protects groundwater for drinking sources as well as reduces the sediment and nutrients from springs which comprise the baseflow of area streams
- Subdivision Regulations Article IV Section 10 and Article V Section 6 (Appendix C)
 - Article IV, Section 10 requires all final plats for new developments to be accompanied by restrictive covenants governing the use and maintenance of common area, including detention basins
 - Article V, Section 6 requires detention as part of any new subdivision design for flood attenuation and removal of pollutants
- Zoning Regulations Article IV Section 33, Urban Services Area Policy (Appendix B)
 - Allows for the extension of sanitary sewer to areas outside of the city limits of Springfield to reduce the need for on-site wastewater systems and limit untreated sewage effluent containing nutrients and bacteria from affecting surface and groundwater
- Floodplain Management Regulations: Zoning Regulations Article XXI (Appendix B)
 - Regulates building, grading, and filling in the floodplain. The limitation on development within the floodplain has the effect of preserving a buffer around streams which helps reduce sediment, nutrients and trash reaching surface waters
- Stormwater Design Standards Section 115 (Appendix D)
 - Requires permanent water quality BMPs be implemented on all commercial developments in Greene County. Water quality capture volume is required for the first 1 inch of runoff from the site and released over 24 to 48 hours to increase settling time which improves removal of sediment and associated nutrients and metals.

- Greene County Regulations and Standards for On-Site Wastewater Systems (Appendix G)
 - Requires review and approval of all on-site wastewater system (OSW) designs for all structures not on municipal sewer in unincorporated Greene County. Requires soil analysis and installation inspections for all OSWs. This minimizes the possibility of failure and maximizes the treatment of sewage effluent to reduce the bacteria and nutrients leaking into groundwater and surface water from poorly designed and installed OSWs.
- Education efforts by the Watershed Committee of the Ozarks James River Basin Partnership, and Project WET (as described in Section 4.2.1)

Minimum Control Measures:

4.2.1. Public Education and Outreach

“The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps the public can take to reduce pollutants in storm water runoff”.

4.2.1.1.

Greene County’s strategy to incorporate public education into our storm water management program relies heavily on partnering with and supporting existing education/advocacy groups such as the Watershed Committee of the Ozarks, James River Basin Partnership, Ozark Greenways and Project WET (Water Education for Teachers). Greene County can best utilize our limited fiscal and human resources by financially supporting these groups whose sole focus is increasing public awareness of water quality and quantity issues confronting our community. All of these groups work with each other so intricately that the cooperation between each of these groups further magnifies their ability to reach the public.

Greene County’s public education strategy is aimed at addressing as many urban stormwater pollutants as possible through the program described in sections 4.2.1.1.1 through 4.2.1.1.5. These pollutants include, but are not limited to nutrients, bacteria, sediment, solid waste, and household chemicals.

Even before being required to do so by the MS4 permit, Greene County has been active in efforts to educate the public on their contribution to stormwater pollution and what steps they can take to improve our water resources. From the inception of both organizations Greene County has helped partially fund both the Watershed Committee of the Ozarks (WCO) and the James River Basin Partnership (JRBP). Both of these organizations were formed with the mission of informing the public about water resources and how to protect them. Greene County’s cooperation with these two organizations is the main vehicle utilized to inform the public about storm water issues. Greene County recognizes that the school kids of today will be the policy and decision makers of tomorrow. Therefore we have made it a priority to financially support Project WET (Water Education for Teachers) to help educate school children about how important it is to protect water resources for the future.

Public Education and Outreach

Greene County provides financial and other support to our partner organizations to educate the public about protecting our water resources.



Figure 7: JRBP Watershed Festival Groundwater Demonstration



Figure 8: Continuing Education Class at the Watershed Center

4.2.1.1.1

The target audience for our storm water education is very diverse. Through the Watershed Committee of the Ozarks, school children are taught about the need to protect water quality since they will be managing storm water in the future. The JRBP focuses many efforts on the rural sections of the James River watershed with landowner partnerships focused on conservation easements and riparian buffers. Project WET focuses on helping teachers incorporate water quality protection into their daily classroom curriculum. As part of our partnership with the Watershed Committee of the Ozarks, Greene County also has built and maintains an on-site wastewater installation training facility as a demonstration and educational tool for septic system designers and installers. The site has been equipped with many different types of on-site wastewater treatment systems. County staff conduct multiple trainings every year for area installers as well as the soil scientists and engineers who design on-site wastewater systems. The Missouri Department of Health and Senior Services also utilizes the Training Center for state certification of on-site wastewater system installers.

4.2.1.1.2

Public education is essential in elevating the level of understanding and awareness which results in changed attitudes and habits which can have a direct impact on water quality. All the regulation in the world will be of no avail if people, especially the kids in school who will make policy decisions tomorrow, do not know of the importance of protecting our water resources. Greene County's strategy to incorporate public education into our storm water management program relies heavily on partnering with and supporting existing education/advocacy groups such as the Watershed Committee of the Ozarks, James River Basin Partnership, Ozark Greenways, Project WET (Water Education for Teachers). Greene County can best utilize our limited fiscal and human resources by financially supporting these groups whose sole focus is increasing public awareness of water quality and quantity issues confronting our community. The watershed organizations that we support provide education programs and information of higher quality and greater quantity than Greene County could do alone.

Watershed Committee of the Ozarks

As part of our commitment to ensuring the permanence of the Watershed Committee of the Ozarks (WCO) mission Greene County will continue funding the WCO with \$15,000 per year for education and operations, plus a portion (\$3,533 per year) of the annual funding for the Dry Sac stream gage. In 2015 Greene County's contribution to the WCO was restored to the general revenue budget rather than from funds held over from the Parks and Stormwater tax that sunset in 2012. This reflects not only the permanence of our commitment to the WCO, but a slight improvement in the County's financial position. With the recent passage of an additional ½ cent general revenue sales tax, we plan to budget an increase in annual funding for the Watershed Committee back to the full \$68,000 Greene County contributed prior to 2009. Funding from Greene County, City Utilities, and the City of Springfield allows the WCO to leverage those funds into much bigger projects through many of the grants the WCO receives. The C.W. Titus Watershed Center was completed in July of 2011 at Valley Water Mill Park to house WCO staff and serve as an educational center for area students and residents to experience and learn about the importance of protecting water resources for drinking, recreation, and wildlife. Greene County provided a portion of the funding for the C.W. Titus Watershed Center from the now sunset Parks and Stormwater sales tax.

Below are some of the Watershed Center's educational impacts during the previous permit cycle:

- From 2012-2016 field trip participation has increased from 1600 to 4735 students per year visiting the Watershed Center and Valley Water Mill Park. A total of more than 14,000 students participated in these field trips over this five year period.
- From 2013-2016 the Watershed center
 - o hosted 336 field trips
 - o had a booth at 45 community events
 - o conducted 69 tours of Jordan Creek
 - o provided opportunities for volunteers to give over 7,500 hours of service time

A full list of the Watershed Committee's activities and publications can be found at <http://www.watershedcommittee.org/>

James River Basin Partnership

As concerns over water quality in Table Rock Lake grew in the 1990's Greene County joined other counties and cities in the James River watershed in the formation of the James River Basin Partnership. Greene County provides \$5,000 in annual funding to the James River Basin Partnership (JRBP) for watershed education and projects within the James River watershed including their septic tank pump out and rain garden programs. Greene County also partners with The City of Springfield and JRBP in providing a rebate incentive program for rain barrel purchases at certain stores in the area. Each year Greene County budgets \$1,500 to give to JRBP as part of their Rain Barrel Rebate program which incentivizes property owners to install rainwater harvesting practices. Some of JRBP's educational activities during the previous permit cycle have included:

- 294 septic tank pump outs for onsite wastewater treatment system maintenance.
- 107 soil tests and nutrient management plans for homeowner's lawns
- River clean-ups on the James River, Lake Springfield, South Creek and Wilson's Creek removing over 200 tires and nearly 10 tons tons of trash
- 10 watershed festivals educating more than 3,000 5th graders about water quality protection
- Numerous publications, brochures, booths at community events and various other outreach activities

Greene County was proud to partner with the JRBP in 2014-2015 on their Riparian Restoration and Protection 319 grant. This grant has provided a vehicle to place several miles of riparian corridor under the protection of permanent conservation easements. This grant has also provided several miles of livestock exclusion fence and planted thousands of trees to re-establish healthy riparian corridors.

The Watershed Center

The C.W. Titus Watershed Education Center at Valley Water Mill Park serves as an educational destination for students and the public to learn about watershed protection, water quality, ecology, and storm water best management strategies. The park features a spring, caves, a lake, and trails which provide a natural setting to convey the importance of protecting our water resources.



Figure 9: Students Collect Macroinvertebrates during a field trip at the Watershed Center

Geomorphic surveys indicate these efforts have already saved and estimates 3,900 tons of soil from entering the James River. As discussed above in the sampling results and in the Integrated Planning discussion (section 4.2.2.1.4) this type of partnership and type of management practice is something that would positively affect nutrient and sediment loads coming from areas higher in the James River Watershed that are outside of the regulated MS4 urbanized area if that is one of the pollutant sources identified by the MCDA as a priority.

A more extensive listing of the JRBP's activities and programs are detailed at <http://www.jamesriverbasin.com/>

Project WET (Water Education for Teachers)

In cooperation with the City of Springfield, and WCO, Greene County contributes \$10,000 annually to fund the Project WET State Coordinator. Project WET staff participate in field trips and classroom lessons to directly educate students on how they can help improve water quality. More importantly, project WET conducts teacher workshops and trainings to give teachers the materials and activities needed to be able to use water quality lessons in their science curricula to fulfill MO education standards for science education. Project WET helps teachers make the connection between teaching about water, and the fulfillment of required state standards by showing teachers how to integrate water education into their regular classroom lessons. Instilling an awareness of the importance of water quality in the lives of young students is one of the most important and effective ways we can protect water quality for the future. Project WET gives teachers the tools to incorporate water education into their curriculum throughout every district in the state of Missouri. This enables the educational efforts to be spread far beyond a single geographic area and reach far more students than any single event as teachers incorporate water quality into their lessons year after year. Locally, the Project WET State Coordinator cooperates closely with the WCO Education Coordinator to conduct field trips and classroom lessons and with the JRBP to facilitate the watershed festivals for 5th graders. Education of children even outside the regulated MS4 and outside Greene County can still be of benefit since much of the James River watershed and the watersheds that provide drinking water to the Springfield area are outside the regulated MS4 area. More information on Project WET can be found at <http://projectwet.missouristate.edu/>

Onsite Wastewater Training Center at Valley Water Mill

The On-Site-Wastewater Training Center provides a hands-on outdoor classroom for instructing onsite wastewater treatment system installers as well as the general public on correct installation and maintenance of different on-site wastewater systems. This educational center helps ensure the proper installation and maintenance of on-site wastewater systems. Classes focus on soil suitability, pretreatment systems, and proper installation of different types of systems. Proper installation and maintenance of these systems is the first step in ensuring that untreated sewage effluent does not reach our waterways either as surface runoff or in groundwater that recharges the areas many springs. Contractors are not allowed to install OSW systems in Greene County unless they have been licensed by the Missouri State Department of Health and Senior Services (HSS) and successfully completed the



Figure 10: Greene County inspector Michael Bowers demonstrates a shallow-placement lateral line during a training for OSW installers and designers at the training center at Valley Water Mill

certification training conducted by Greene County staff. Installer certification lasts for three years at which time the installer must take a re-certification training conducted by Greene County staff in order to maintain their ability to install OSW systems in Greene County. Greene County certification/re-certification classes are typically offered twice per year, or when there is enough demand. In the previous permit cycle there have been there have been 14 training sessions to certify/re-certify septic system installers with 183 total attendees. Additionally, HSS held 2 trainings for 60 installers and regulators. Missouri State University and Ozarks Technical College have held classes at the site for Environmental Studies students. The County also utilizes educational brochures that are given to every homeowner when a septic system is installed, repaired, or expanded. These brochures are particularly effective when given to homeowners who have experienced a failure of their septic system and must have it repaired (see available brochures in Appendix E).

4.2.1.1.3

As described in detail in the preceding sections, the water quality organizations with whom Greene County partners are well experienced in providing information to the public about getting involved in improving water quality. The financial support provided by the county is part of what enables organizations like the WCO to provide an opportunity for people to take direct action to be involved in water quality improvement. Through emails, meeting, and their website, the WCO informs people of opportunities such as volunteer

projects at the Watershed Center (from 2104-2016 volunteers gave over 6,000 hours of their time), prescription drug take back events which have collected over 3,000 lbs. of unused medicine. The WCO also conducts tours of Jordan creek, an urban stream that demonstrates all the negative effects of urbanization on waterways and their water quality PSA aired on the local NBC affiliate during the summer Olympics in Rio de Janeiro. The JRBP also utilizes emails to their membership, their website, speaking events and even add spots on the local NBC affiliate TV station to spread the word about their programs. Their “Because we all live downstream.” campaign airs on KY3. The annual River Rescue on the James River, along with clean ups on several other streams has given hundreds of volunteers a chance to get involved in removing thousands of pounds of trash from our waterways. People can get involved in water quality protection through the JRBP's septic pump out program and rain barrel rebate program as well.

4.2.1.1.4

The County's independent educational efforts and partnerships with educational organizations utilize brochures, social media such as Facebook and blog posts, newsletters, pamphlets, educational workshops, speaking presentations, field trips, classroom curricula, informational signage, and TV advertisements to get the message out to the public. The Watershed Committee's classroom education efforts have reached thousands of students, as have the JRBP's watershed festivals. TV ad spots by both

JRBP and WCO have reached thousands more. The Watershed Center at Valley Water Mill has proven to be a valuable tool in educating thousands of children through field trips and the Wastewater Training Center allows the training of wastewater system installers and designers. With so much current focus on school age kids, in 2016 the Watershed Committee partnered with Drury University to develop and implement a marketing campaign strategy to target reaching 30-45 year olds with water quality education.

4.2.1.1.5

The County's educational program is designed to address multiple pollutants including but not limited to sediment, nutrients (TN and TP), bacteria, chlorides and toxics, etc.

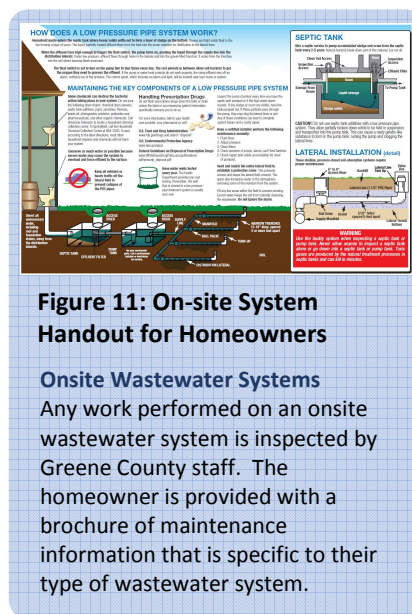
Purpose and Expected Results

The County's OSW installer training is designed to maximize the treatment of sewage effluent to prevent bacteria and nutrients (TN and TP) from reaching surface and groundwater. Septic system handouts are intended to help homeowners understand the importance of maintaining their OSW system to prevent bacteria and nutrients from getting into surface or groundwater. We expect that the education of installers, designers and homeowners on proper OSW system design, installation and maintenance will result in will result in a minimizing the bacteria and nutrient loading form failing OSW systems.

During field trips to the Watershed Center and during JRBP's watershed festivals students learn about the hydrologic cycle and how increased runoff affects causes erosion and increased sediment. Students learn how pet waste can be a source of harmful bacteria in runoff. They also learn how fertilizers and can be improperly used and pollute surface waters creating algae blooms and how runoff from streets, parking lots and urban areas can contain metals, oils, pesticides and other toxics that can harm aquatic organisms. Students learn how all activities and pollutants within a watershed ultimately affect someone's drinking water and steps they can take to conserve water and prevent pollution. We expect that the education of school kids will influence future generations to be more aware of the importance of water and take steps in their lifestyle to prevent water pollution in their daily lives. If enough people can be educated to take action to reduce pollutants, ultimately water quality will improve.

Project WET works with teachers throughout the state to incorporate water education and activities into Missouri's Next Generation science Standards. By educating students, both directly and through information dissemination to teachers within Greene County's MS4 area and Southwest Missouri, we expect future generations will be more aware of the importance of water and take steps in their lifestyle to prevent water pollution in their daily lives. This will reduce the amount of pollutants reaching urban waterways.

The training component of MCM #6 also addresses chlorides, sediment, and petroleum by educating County Highway Department staff about the importance of proper use of salt during icy/snowy weather,



erosion controls during construction projects, and protecting fueling materials storage from exposure to rainfall and runoff. Different trainings throughout the permit cycle address other various potential stormwater pollutants such as organic toxics found in road sealants, paints, and petroleum products.

Measureable Goals

The only measureable metrics under Greene County's control are the amount of money we are able to contribute to our partner organizations and the education of OSW installers. Our first measureable goal is to maintain our contributions, at least at the current levels stated above, to "hire" our partner organizations (WCO, JRBP, Project WET) as the educational arm of Greene County. Our second measureable goal is to make sure that each OSW installer in Greene County goes through our certification course at the Valley Water Mill training center and is re-certified when their certification period ends.

Primary Responsibility

Greene County's Environmental Compliance Manager is primarily responsible for coordinating the educational efforts with our partner organizations (WCO, JRBP, and Project WET) and reporting to DNR. The funding provided to our project partners comes from the Greene County Resource Management budget and is managed by the Environmental Planner. Educational activities are conducted and reported by the Greene County Resource Management Department, Watershed Committee of the Ozarks, James River Basin Partnership, and Project WET.

Iterative BMP Evaluation

Greene County essentially "hires" our project partners as educational contractors/consultants in partial fulfillment of our education program requirements. Each of our partner organizations publishes an end of the year report and has their activities on their website. We can evaluate the numbers of outreach events and activities, numbers of participants, volunteer hours etc. If we feel that the educational efforts of an organization (with consideration of external factors and extenuating circumstances) are not reaching as many people, or are no longer focused on water quality then we can re-evaluate whether County funds should still be contributed. We do not anticipate ever encountering this scenario as we have had strong partnerships with each of the organizations all of whom have a long history of effective and efficient water quality outreach activities.

Much of the educational materials that have been developed are available online. Appendix E includes the relevant website addresses. Hard copies can be made available to MDNR upon request.

4.2.2 Public Involvement/ Participation

"The permittee shall implement a public involvement/participation program that complies with State and local public notice requirements and involve the public in the development and oversight of the SWMP, policies and procedures".

Greene County's public involvement and participation are activities intended to seek public input, comment, or approval for stormwater related matters such as zoning hearings, citizen task forces and work groups, and voter initiatives. This element of Greene County's program is also intended to provide opportunities for hands-on involvement through our cooperation with various partner organizations. Water quality and protection of water resources are very important to the citizens of Greene County. Zoning hearings for new and re-development projects typically are attended by many members of the public who voice their concerns about the potential impacts on water quality. The Public is also encouraged to attend the Watershed Committee's monthly meetings to provide input, ideas and information on watershed issues. The Integrated Planning (IP) partnership between the City of Springfield, Greene County, and City Utilities convened an Environmental Priorities Task force comprised of community members as one of the first steps in the IP process. Every subsequent step in the IP process is built on the communities priorities identified by this task force.

4.2.2.1.1

Greene County's draft Stormwater Management Plan was posted for public comment from September 19 through October 31, 2017 on the Environmental section webpage (https://greenecountymo.gov/resource_management/environmental/). During this 44-day public comment period Greene County received no public comments to incorporate into the SWMP document.

Greene County follows all public notice requirements found in the applicable state statutes. All ordinances that have been passed as part of compliance with the County's NPDES permit have been posted for public notice with hearings held for public input before being adopted by the County Commission. The County's sediment and erosion control regulations, post construction water quality treatment requirements, and illicit discharge ordinance are the foundation of all of Greene County's efforts to improve water quality. All these ordinances that satisfy the conditions of this permit were subject to public notice requirements and adopted after publicized zoning hearings open to public input. All went through public hearings before the Planning and Zoning Board with the required public notice period before being adopted. Staff also regularly attend the Home Builders Association (HBA) monthly meetings, and seek input from the Developers Input and Information Group (DIGG) on any proposed policy or regulation change.

4.2.2.1.2

Greene County considers the 44-day public comment period on the SWMP, along with the other public notice efforts described above to be sufficient for compliance with the public notice requirements of the permit. We do not consider a public meeting regarding the SWMP and renewal application to be needed.

4.2.2.1.3

Like the public education program, Greene County's plan to involve stakeholders relies heavily on the non-profit organizations that we support financially to provide opportunities for the public to be directly involved in service events such as river clean ups, prescription drug take back events, urban creek tours and other volunteer opportunities. There are numerous other ways for the public to get involved as volunteers with various organizations supported by Greene County. During the previous permit cycle the James River Basin Partnership's annual River Rescue on the James River along with other stream clean-ups have provided opportunities for hundreds of volunteers to remove more than 10 tons of trash out of part of the James River and its tributaries. The Watershed Committee of the Ozarks also provides many opportunities for public involvement through many of their programs. The Adopt-A-Spring program relies on volunteers to collect temperature and water quality data quarterly at area springs. This seven year old program has amassed a large quantity of data that can be used to track changes over time and help locate any problem areas. Volunteers at the Watershed Center have logged over 7,500 hours in the previous permit cycle from various groups helping with education and maintenance at the Watershed Center. Some of the organizations that have been able to get involved in these water quality projects are students from Missouri State University, Drury University, Ozarks Technical Community College, the Boy Scouts of America, and individual citizens.

The Watershed Committee of the Ozarks also partners with the Greene County Sheriff's Department, Community Partnership of the Ozarks, and area pharmacies to coordinate an annual prescription drug take-back event. In the last permit cycle this annual event has provided citizens the opportunity to be directly involved in protecting our water resources by keeping a total of over 8,100 pounds of pharmaceuticals out of waterways where they can harm aquatic life and human health in our drinking water.

The opportunities for public involvement include the 30-day online public comment period for the SWMP, formal public comment periods for new ordinances, and zoning hearings listed above. County staff also hold quarterly meetings with the Springfield Home Builders Association to receive input from the building community on County activities and upcoming regulatory changes. Likewise, County staff attend the meetings of DIIG (Developers Input and Information Group) as well as the Contractor's Association.

4.2.2.1.4

Greene County does not utilize a stormwater management panel/committee, however the Springfield-Greene County Integrated Planning (IP) process relies on the input of the community to set the priorities for programs and actions that protect the environmental resources that are most important to citizens. The Springfield-Greene County Integrated Plan is a cooperative effort between the City of Springfield, Greene County, and City Utilities. In 2014, these three cooperative partners convened the Environmental Priorities Task Force composed of business professionals, environmental non-profits, citizens, and other government agencies representing a broad cross section of the community to give input and direction to priorities that should guide the IP process.

In June of 2012, EPA released its “Integrated Municipal Stormwater and Wastewater Planning Approach Framework” which emphasized a commitment to work with states and communities to implement an integrated planning approach to address environmental objectives. The goal of the integrated planning process is to identify better ways to meet the regulatory requirements in a financially sustainable way.

In response to this opportunity, leaders from the City of Springfield, Greene County and City Utilities developed a local approach to integrated planning titled “A Citizen Focused Approach.” This holistic approach proposes to use local knowledge to examine our environmental resources related to wastewater and stormwater as well as solid waste, drinking water, and air quality. The planning approach has received written approval from both the Missouri Department of Natural Resources and EPA Region 7. The Springfield – Greene County community is working hard to implement an Integrated Plan to protect natural resources by prioritizes solutions to address the most pressing problems that matter most to our community in a manner that is affordable to our citizens. The Springfield-Greene County Integrated Plan is comprised of four phases:

Phase I:

This is the Assessment Phase and answers the question, “Where are we now?” During this phase, local stakeholder groups have been gathering data to assess the current status of our environmental resources. We realize that we can’t measure success without first establishing a baseline from which to measure. One component of this phase has been to create comprehensive GIS database that includes everything from stream sampling data and wastewater infrastructure to land use and geology. By using a common platform to share information, our stakeholder groups can better see how each of these environmental issues relates. By pulling together all the known information we can begin to see where environmental problems are and how they could be connected to potential sources. Figure 12 shows an example of the water quality data for total nitrogen that has been compiled by putting many different data sources into one common database. Stormwater data also includes, but is not limited to hydrology, pathogens, nutrients, metals, biotic taxa, and toxic organics. The database is only the start however, because even though the water quality data can tell us the location of pollution problems and some of the probable sources they cannot tell us which pollution sources are causing the biggest problem, nor can they tell us how to prioritize possible solutions.

Phase II:

The second phase of our approach is our Vision Phase and answers the question “Where do we want to be?” As a community, we believe we have achieved success when:

- Community resources are directed towards managing environmental issues using the most effective solutions to address the most significant problems in a way that is affordable to our citizens.
- We are in compliance with Federal and State regulations while addressing the specific needs of our community.
- We have the ability to address water, air, and solid waste issues holistically allowing both our community and the regulators to operate more efficiently.

- We have a community culture that understands and supports the goal of high-quality environmental resources and supports these efforts through stakeholder involvement. Our community has a high level of trust that resources are being used to address environmental issues efficiently and effectively.
- Our community has a clear understanding of how funding and other resources will be used to improve environmental quality.
- Our community realizes a competitive advantage toward growth and economic development and an increase in quality of life as a consequence of this plan.
- We have identified specific goals relevant to each environmental resource.

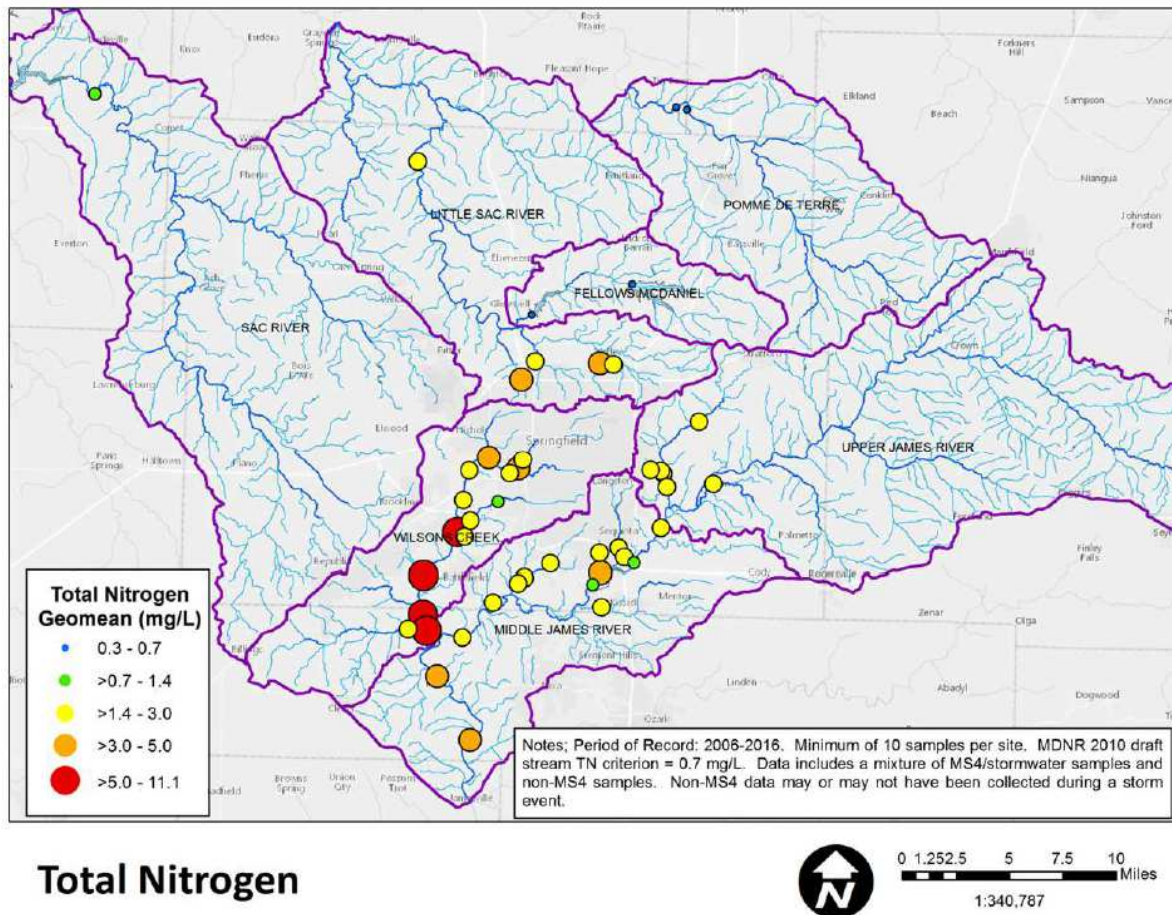


Figure 12: Total Nitrogen data from IP database

Phase III:

We are currently in our Tactical Phase trying to answer the question “How will we get there?” During this phase, input from stakeholder groups is needed to prioritize our community’s environmental needs based on four key elements:

1. Identify and prioritize the most significant Sources of Pollution:

Using a Multiple-Criteria Decision Analysis (MCDA) toolset developed specifically for the Integrated Plan, we are able to take a structured look at how different pollutants impact the natural environment and the relative significance of each source.

In the previous permit cycle the Integrated Planning Partners (City of Springfield, Greene County, and City Utilities) have worked with our consulting firm to use the water quality data discussed above to develop a Multiple-Criteria Decision Analysis (MCDA) toolset specifically for the Integrated Plan. The MCDA will be used to take a structured look at how different pollutants impact the natural environment and the relative significance of each pollutant source. The MCDA toolset will be used to identify and prioritize the most significant sources of pollution with the goal of then using the sustainable return on investment (SROI) tool to ultimately identify optimal solutions to the identified and prioritized pollutant sources. HDR, Inc. was selected as the consultant who will develop the MCDA tool. The first step in developing the MCDA was to assemble an Environmental Priorities Task Force (discussed below on page #) to determine which environmental resources are the most important to our community. The MCDA assigns a numeric weighting to each factor related to pollutants that affect the community’s identified environmental priorities. As discussed in greater detail on pages 28 and 29, the Environmental Priorities Task Force identified five areas of water quality priorities. The community felt that clean drinking water was the highest priority followed by impacts on aquatic life. Waterbody aesthetics, primary and secondary contact recreation, and fish consumption tied for third in order of water quality importance for the Environmental Priorities Task Force. The community priority weighting is combined with a pollutant weighting factor based on inputs such as the significance of the pollution source, geographic scale of possible effects, relative contribution, hydrologic condition, and risk of pollutant species. By numerically normalizing the impacts of pollutant sources on community identified environmental priorities, we can begin to determine which pollutant sources are contributing the most pollution that is causing the most harm to the resources our community values the most. The MCDA allows us to compare on an “apples-to-apples” basis for example whether streambank erosion or sanitary sewer overflows is the more harmful pollution source, or if urban runoff or land disturbance runoff is having the greatest impact and should be prioritized for action above other pollution sources.

2. Identify and prioritize the most **Effective Solutions**.

Even though the MCDA can identify the pollution sources that are most important to address, we must still determine how to address them in a way that maximizes benefits and minimizes costs to our citizens.

Using the Sustainable Return on Investment (SROI) approach that has already been developed by HDR, Inc., our planning team will evaluate the environmental, economic, and social costs and benefits for many of the solutions considered by our community. Once the MCDA identifies the pollutants having the greatest impact, we can use the SROI to evaluate various solutions to that specific pollutant and determine which solutions give the most benefit (environmentally, socially, and financially) for the money spent. By finding the “triple bottom line” considering the financial, social, and environmental benefits of any proposed solution, we can ensure that the most effective solutions are being targeted toward the most serious problems. For example, if the MCDA determines that streambank erosion is a pollution source that is most pressing to address, the SROI allows us to compare on an “apples-to-apples” basis whether bank stabilization projects or retrofitting existing detention basins to control hydrology would have the greatest financial, social, and environmental benefit for each dollar spent.

3. Capture our **Community’s Priorities**.

In the Ozarks, our quality of life and economic development are tied directly with the quality of our natural resources. We realize the importance of protecting these resources and the ways our community is unique. The Environmental Priorities Task Force began meeting on May 27, 2014 and held their final meeting on December 2, 2014 and held a total of 9 meetings. Their final report was delivered to a joint meeting of the Greene County Commission and Springfield City Council on March 27, 2015. This group of citizens was asked to identify the environmental resources (water, air, and land) and resource uses that are the highest priority to the community. The question they were tasked with answering is “if you only had one dollar to spend on water, air, and land resources, where would you spend it?” The task force was asked to consider, not just water quality, but also air quality, solid waste, and land pollution issues as a collective whole, not just individually. By proactively addressing the issues that our citizens find important, rather than simply reacting to the latest regulation, we will build trust and support for our programs. The Environmental Priorities Task Force identified having and clean and healthy drinking water supply as the community’s highest priority. Tier 2 priorities included reduction of health related air quality issues and protection of fish and aquatic life, streams that are swimmable, and attainment of air quality standards to attract and retain business.

Environmental Priorities Task Force

The Springfield Greene County Environmental Priorities Task Force was convened to identify the environmental priorities the community should address first in an integrated plan



**Figure 13: 2014-2015
Environmental Priorities Task
Force Meeting**

The Environmental Priorities Task Force was empaneled to help guide decision-making regarding environmental planning for the City of Springfield, City Utilities, and Greene County, Missouri. They are a citizen's task force formed to represent community interests. During each meeting, Task Force members were asked to think about WHAT issues were the most important to them as well as WHERE they were important. Task Force members participated in several individual and group exercises designed to provide a forum for discussion and to make the group consider their priorities. At the conclusion of each meeting, the group was asked to discuss and further refine their recommendations, many of which developed out of the group exercises they participated in.

Environmental Priorities Task Force: Community's Watershed Priorities

The following lists the water quality objectives, in priority order, and describes the watersheds where these objectives are most important:

- Protect our drinking water sources: McDaniel Lake, Fellows Lake, Upper James River, Fulbright Spring Recharge Area, and Upper Little Sac.
- Support aquatic life in waterways where people fish and consume fish they catch: Lower James River, Sac River, Little Sac River, and McDaniel/Fellows Lake.
- Protect water from pollution in Lower James River, Upper James River, Sac River, and Little Sac River in areas where people swim.
- Protect waterways used for irrigation and that support livestock and wildlife.
- Protect Lower James, Wilson's Creek, and Little Sac so people can wade and boat in these waterways.
- Improve the aesthetics of Wilson's Creek. There is an important trail system in this watershed and it is positioned upstream of important recreational uses.

The Environmental Priorities Task Force is one of the primary ways in which the Integrated Plan hopes to capture our community's priorities. By incorporating community priorities as one component of our decision making process, we hope to ensure that valuable community resources are directed toward effective solutions that fix pressing problems **in areas and on problems that matter most to our citizens**. Traditionally, environmental regulations are driven by technical, political, and legal priorities. While each of these factors play a vital role, it is important to recognize that the role of citizen input on community investments is just as important.

The priorities identified by the task force will help weight the identified pollutant sources to ensure that the pollutant sources that most affect the resources identified by the citizens as the most important, will be addressed first. The input from the Environmental Priorities Task Force is the guiding force behind every step as we move forward with the Integrated Plan. The Environmental Priorities Task Force Final Report is included in Appendix F along with a link to more information about the Springfield-Greene County Integrated Plan.

4. Assess our community's **Financial Capability**.

Our community applauds the efforts that EPA has made in working with the US Council of Mayors, American Water Works Association, Water Environment Federation, and others in finding new ways to assess community affordability. With the help of a Citizen Advisory Committee, our community will make an honest assessment of financial capability and take a candid look at how community resources should be allocated toward environmental stewardship.

Assess our community's financial capability: Our community will work together to evaluate financial capability and take a candid look at how community resources should be allocated toward environmental stewardship.

Phase IV:

The fourth phase of our approach is the Adaptive Management phase. As we achieve success and learn more, the target will continue to move. We must continually refine our analysis, check the effectiveness of our solutions, and constantly reprioritize.

4.2.2.1.5

As described in Section 4.2.2.1.3, the County provides financial support and technical assistance to several partner organizations including the Watershed Committee of the Ozarks, and the James River Basin Partnership. In addition to their educational efforts, each of these organizations provides opportunities for community members to be actively involved in watershed protection activities.

The James River Basin Partnership's annual River Rescue on the James River along with other stream clean-ups throughout the year provide opportunities for hundreds of volunteers to remove trash from the James River and its tributaries. The Watershed Committee of the Ozarks also provides many opportunities for public involvement through their programs. The Adopt-A-Spring program relies on volunteers to collect temperature and water quality data quarterly at area springs. Volunteers at the Watershed Center have logged over 7,500 hours in the previous permit cycle from various groups helping with education and maintenance at the Watershed Center. Some of the organizations that have been able to get involved in these water quality projects are students from Missouri State University, Drury University, Ozarks Technical Community College, the Boy Scouts of America, and individual citizens. The Watershed Committee of the Ozarks also partners with the Greene County Sheriff's Department, Community Partnership of the Ozarks, and area pharmacies to coordinate an annual prescription drug take-back event.

4.2.2.1.6

Greene County feels that our partnerships with various groups provides the opportunities for citizens to be involved with and receive education about various aspects of our SWMP.

Purpose and Expected Results

Greene County's 44-day public notice period is intended to provide those citizens interested in the SWMP a means to submit suggestions and input on how the SWMP should be developed and written. The County's partnerships with the WCO and JRBP provide opportunities for citizens to be involved in stream clean ups, water quality data monitoring, and educational efforts and regular meetings. The County's normal functions of Planning and Zoning and Boar of Adjustment hearings give citizens the opportunity to voice their opinions on individual developments as well as the regulations enacted by the County that affect development and environmental regulation. We believe that citizens who are involved in water quality protection are going to be invested in water quality protection. By providing opportunities for people to be involved we expect that their investment in water quality will deepen and their actions will result in an improvement to water quality.

Measureable Goals

Our goal is certainly to have a long enough period available to the public to give input on the SWMP. Our goal is to have at least a 30-day public notice period where the SWMP draft is posted on the Greene County website. https://greenecountymo.gov/resource_management/environmental/

Primary Responsibility

Greene County's Environmental Compliance Manger is primarily responsible for writing and updating the SWMP and ensuring the public notice period is adequate. The funding provided to our project partners comes from the Greene County Resource Management budget and is managed by the Environmental Planner. Community/Public involvement events are conducted and reported by the Watershed Committee of the Ozarks and the James River Basin Partnership.

Iterative BMP Evaluation

If we do not receive very many individual responses giving input for the SWMP during the 30-day public notice period we will certainly consider extending the public notice period to 60 or possibly even 90 days for the next permit. Greene County essentially "hires" our project partners as contractors/consultants for their ability to provide involvement opportunities for the public in partial fulfillment of our public involvement and participation requirements. Each of our partner organizations publishes an end of the year report and has their activities on their website. We can evaluate the numbers of participation activities; stream clean ups, spring monitoring data collected, volunteer hours etc. If we feel that the efforts of an organization are not providing the needed participation opportunities then we can re-evaluate whether County funds should still be contributed. We do not anticipate ever encountering this scenario as we have had strong partnerships with each of the organizations all of whom have a long history of effective and efficient activities to get the public to participate in water quality protection.

4.2.3 Illicit Discharge Detection and Elimination

"The permittee shall develop, implement, and enforce a program to detect and eliminate illicit discharges as defined in 10 CSR 20-6.200 and 40 CFR 122.34(b)(3), into the permittee's regulated Small MS4".

4.2.3.1.1

Greene County has developed a very detailed map of the storm water management system. This map shows the location of all inlets, pipes, open channels, detention basins, and outlets of storm systems in the regulated MS4 as well as certain portions of unincorporated Greene County that do not fall under MS4 regulation. The map also contains the locations and names of all waters of the State and their tributaries, including those that receive stormwater discharge from the MS4. The LiDAR (light detection and ranging) data that was collected in 2010-2011 allows us to have very detailed 1-ft contour interval topography which enables us to determine the path of runoff both before and after it enters the regulated MS4 stormwater system. The stormwater system map was built in, and is accessed through ESRI's ArcMap GIS program. To develop the map, the locations of all components of the stormwater system (detention basins, pipes, inlets, open swales, junction boxes, culverts, and bridges) were field verified by County cartography staff. Pipe diameters were catalogued to enable query by size. The stormwater system is just one of many layers accessible in the County GIS system allowing for the simultaneous viewing of other infrastructure or natural features that can influence the stormwater system. The GIS map of the stormwater management system is updated in several ways. As plans for new developments are approved, the final plans are digitized and the stormwater improvements for each individual project are added to the overall system map. Additionally, as errors and omissions in the map are discovered through routine maintenance or inspection the corrections are forwarded to the GIS technician who can then update the map. Maps of the illicit discharge outfalls/screening locations are included in Appendix G.

4.2.3.1.2

Illicit discharges into Greene County's MS4 are prohibited by Article IV, Section 25 of the Greene County Zoning Regulations to reduce the contribution of pollutants to the municipal MS4 in stormwater discharges. See Appendix B for a copy of Article IV, Section 25 of the Greene County Zoning Regulations.

The greatest potential non-stormwater discharge is wastewater from residences, businesses and industry since not every property in the county, or even within the urbanized boundary is served with sanitary sewer. The Greene County Regulations and Standards for On-Site Wastewater Systems (Greene County Standards) sets forth the design requirements for all properties in the county not served by sanitary sewer. These standards have been adopted by the Greene County Commission as part of the Building Code for unincorporated areas of Greene County in accordance with the provisions of Sections 701.035 and 701.047 RSMo. The County wastewater regulations are available on the Greene County website, at the link found in Appendix G. Although most on-site waste water system failures are not within the urbanized area boundaries, and thus not under MS4 permit regulation, there are many homes in the urbanized area not yet connected to sanitary sewer. Failing OSW systems pose a severe pollution threat to human health, and to surface and/or groundwater. Failing OSW systems are investigated and required to be repaired as described in Chapter 2, Section A(3) through A(6) of the Greene County Standards.

4.2.3.1.3

The greatest potential non-stormwater discharge is wastewater from residences, businesses and industry since not every property in the county or even within the urbanized boundary is served with sanitary sewer (Aley and Thomson, 1984, Aley and Thomson, 2002). Greene County takes a number of steps to locate and eliminate discharges of wastewater especially from failing on-site wastewater treatment (OSW) systems. Although most OSW system failures are not within the urbanized area boundaries, they are illicit discharges that pollute our surface and/or groundwater and are treated accordingly. Illicit discharges also include illegal dumping, discharge and disposal of liquid and solid waste into any storm water conveyance structure. Every new building is inspected by Greene County Environmental staff to verify that sanitary sewer connection is made to the proper main and not to a stormwater conveyance system. Two wastewater inspectors are on staff to evaluate and inspect all new OSW systems that are installed in the county to ensure that they are designed and installed in accordance with the standards set forth in the Greene County Regulations and Standards for On-Site Wastewater Systems (see Appendix G). On-site wastewater program activities designed to address non-stormwater discharges include:

1. Review of soils reports and design plans for new and replacement OSW systems (Chapter 2, Section B(1) and B(2))
2. Inspect installation of all new and replacement OSW systems (Chapter 2, Section H)
3. Education and certifications for OSW system installers also as part of the public education MCM (see Section 4.2.1.1.2 on page 18 of this SWMP). Installers of OSW systems must obtain a biennial certification from the County. A written examination is required for certification (Chapter 2, Section F). The County provides annual certification training classes for OSW system installers.
4. Facilitate the formation of new sewer districts
5. Inspect all new connections to sanitary sewer
6. Investigate failing OSW systems (failure being defines as the discharge of raw effluent to the ground surface or to groundwater or effluent backing up into the structure) and ensure the proper repair of the failing OSW system (Chapter 2, Section A(3)-A(6)).
7. Investigation of illegally installed OSW systems (Chapter 2, Section A(3)-A(6)).

The OSW program has been very effective in reducing the effluent pollution potential and protecting our water resources, especially to groundwater, since construction standards were put into effect in 1993 (Aley and Thomson, 2002).

OSW Systems

Greene County inspects all new and repaired OSWWT systems, failing OSWWT systems, and new connections to sanitary sewer to protect surface and groundwater.



Figure 14: Lateral Line Installation Inspection



Figure 15: Class for homeowners at the On-Site Wastewater Training Center

In addition to Greene County's OSW program, non stormwater discharges into the County owned and operated stormwater system, including discharges from illegal dumping and spills are detected and addressed in several ways.

The Greene County Environmental Division has a link on our web page where citizens can report water pollution/illicit discharges. The link on the webpage sends an email report directly to the Stormwater Engineer, the Environmental Compliance Manager, and the Water Quality Field Operations Manager. Any of these staff members can investigate, or direct one of the field inspectors to investigate the report and attempt to determine the cause of the pollution. The website for the illicit discharge reporting is at the link below and included in Appendix G.

https://greenecountymo.gov/resource_management/environmental/

County staff also perform annual dry weather screening of the mapped stormwater system to detect illicit discharges, including illegal dumping and spills. The dry weather screening is detailed in section 4.2.3.1.4 below.

4.2.3.1.4

As detailed in Section 4.2.3.1.1, Greene County's stormwater map included all known components of the stormwater conveyance system within the urbanized area. All outfalls as defined in 10 CSR 20-6.200(1)(c)18 have been identified in the GIS mapping system. The 732 identified outfalls are screened at least once per permit period for illicit discharges. Our target goal is to screen at least 147 (20%) per year to ensure that all outfalls are screened during the permit period. Since many parts of the stormwater systems (pipes, detention basins, etc.) are located on private property, County staff do not have right of access to many points where the storm system enters waters of the state. As such, inspections are conducted at the point in the system where the pipe or channels either leaves Greene County right-of-way, or leaves property owned by the County and enters waters of the State.

Screening procedures are as follows:

1. In order to meet the criteria of "dry weather screening", inspections are to take place no sooner than 72 hours following the most recent rain event.
2. Inspection information must include outfall number, date of inspection, and if any discharge was found.
3. If discharge is found the initial assessment will be for visual and olfactory indications of pollutants such as an oily sheen or soap suds on the water, or a petroleum or sewage smell.
4. If none of the above indicators are present, a sample is to be collected and tested with free and total chlorine field indicator strips to determine if the source is a leaking or broken drinking water line. If the result is positive for drinking water indicators, the drinking water utility will be contacted to fix their broken line.

Dry Weather Screening

Greene County has identified 95 major outfalls that meet the definition found in 10 CSR 20-6.200. These outfalls are screened for evidence of illicit discharges at least once a year following a period of at least 72 hours with no measureable precipitation.



Figure 16: Outfall screening location

5. If the water sample is negative for drinking water indicators then the inspector is to follow the discharge toward the source as far as legally possible and collect a sample for analysis of common pollution indicators as listed in DNR Publication 2209. The specific pollutants to be analyzed for will be determined based on the suspected pollution source. For example, if leaking sewage is suspected, then bacterial and/or fluorescence analysis would be the best action
6. If pollutants are present in elevated concentrations and no source can be found, the inspector will consult with the Stormwater Engineer on how to proceed. Options can include written notification to property owners asking for permission to access the property, or notification of DNR.

As described in Section 4.2.3.1.2 above, the Greene County Regulations and Standards for On-Site Wastewater Systems (Greene County Standards) sets forth the design requirements for all properties in the county not served by sanitary sewer. These standards have been adopted by the Greene County Commission as part of the Building Code for unincorporated areas of Greene County in accordance with the provisions of Sections 701.035 and 701.047 RSMo. The County wastewater regulations are available on the Greene County website, at the link found in Appendix G. Although most on-site waste water system failures are not within the urbanized area boundaries, and thus not under MS4 permit regulation, there are many homes in the urbanized area not yet connected to sanitary sewer. Failing OSW systems pose a severe pollution threat to human health, and to surface and/or groundwater. Failing OSW systems are investigated and required to be repaired as described in Chapter 2, Section A(3) through A(6) of the Greene County Regulations and Standards for On-Site Wastewater Systems.

4.2.3.1.5

As the area around the City of Springfield grew in the 1970's and 1980's, the City and County entered into an agreement for the City to extend public sewer outside the City limits into what is known as the urban services area. Nearly all recent development (20 years ago or less) has occurred in this urban services belt in the unincorporated area around Springfield. This leads to a situation where the sanitary sewer lines located within the urbanized area of unincorporated Greene County are the most recently installed portion of the sanitary sewer system and the least likely to be connected to the stormwater system. Areas in Greene County not yet served by sanitary sewer are located in older areas that for the most part have very little drainage infrastructure. It is these older areas not served by sanitary sewer where discharges of sewage are most likely and would be addressed as described in section 4.2.3.1.4 above. Since Greene County's urbanized area is composed almost entirely of residential land use, there is no other criteria than lack of sanitary sewer used to identify areas to prioritize illicit discharge dry weather screening.

4.2.3.1.6

If an illicit discharge is discovered during the course of screening, or is reported by a citizen via Greene County's web page (discussed in Section 4.2.3.1.3) and verified by field inspection, the County will follow the steps below to determine the location of the source of any suspected pollutants (as discussed in Section 4.2.3.1.4):

1. If discharge is found the initial assessment will be for visual and olfactory indications of pollutants such as an oily sheen or soap suds on the water, or a petroleum or sewage smell.

2. If none of the above indicators are present, a sample is to be collected and tested with field indicator strips measuring free and total chlorine to determine if the source is a leaking or broken drinking water line. If the result is positive for drinking water indicators, the drinking water utility will be contacted to fix their broken line.
3. If the water sample is negative for drinking water indicators then the inspector is to follow the discharge toward the source as far as legally possible and collect a sample for analysis of common pollution indicators as listed in DNR Publication 2209. The specific pollutants to be analyzed for will be determined based on the suspected pollution source. For example, if leaking sewage is suspected, then bacterial and/or fluorescence analysis would be the best action.
4. If pollutants are present in elevated concentrations and no source can be found, the inspector will consult with the Stormwater Engineer on how to proceed. Options can include written notification to property owners asking for permission to access the property, referral to the Planning and Zoning Code Compliance Officer to obtain a court order, or notification to DNR.

4.2.3.1.7

Sewer Districts

Greene County would prefer to use a proactive approach to prevent illicit discharges instead of just reacting to them when they occur. Since areas without sanitary sewer are the most likely to have surfacing sewage entering the stormwater system Greene County works with residents to facilitate the formation of sanitary sewer districts to construct sanitary sewer infrastructure and connect these properties to the new sanitary sewer thus eliminating the OSW for each lot. The process of forming a sewer district and constructing a sewer main is lengthy. Residents of a subdivision within the urban services area must initiate a petition effort and have at least 50% of the property owners in the sewer district boundary sign expressing their approval in order for the Greene County Commission to form the sewer district. Greene County then helps develop an engineering plan and per-lot cost estimate of construction. If the cost is acceptable to the residents the County proceeds to secure financing for the project and administer the construction of the project. Upon completion the residents can choose to pay their share of the construction and engineering costs at once, or over a period of ten years via assessment on their property tax bill. Using this method, the County has formed 6 sewer district in the last 10 years comprising a total of 184 lots that can now utilize sanitary sewer rather than OSW systems.

The map in Appendix G shows the areas inside Greene County's urbanized area that are not served by sanitary sewer that are identified as priority areas for forming sewer districts and for dry weather screening.

The optical brightener detection work by Aley and Thomson (2002) gives us strong evidence that Greene County's OSW system program is successful in reducing the amount of sewage effluent reaching our shallow groundwater aquifer. The numbers of homes taken off OSW systems and connected to sewer, as well as the number of failing OSW systems that have been repaired to current standards also provides an indirect measure of the success of this MCM.

Dry-Weather Screening

When dry-weather screening finds an illicit discharge or an illicit discharge is reported via Greene County's website, field tests or laboratory analysis must confirm the presence of a pollutant for further

action to be warranted. The presence of chlorine and/or fluoride indicates a drinking water leak and the supplying utility can be notified and fix the problem. The presence of chlorine can indicate either drinking water or swimming pool discharge. If chlorine is detected above 1 ppm as indicated by the field test, pool owners upstream of the discharge location can be located via aerial photographs and contacted in writing to educate them about DNR's pool discharge requirements found in permit MO-G760000. If no other pollutant can be found (see discussion in section 4.2.3.1.6 of analytical parameters from DNR Publication 2209) in the discharge water it can be safely presumed to be groundwater since this is a heavily karst area and there are many springs and seeps that can find their way into the stormwater system. No further action by the County would be required.

If testing has verified the presence of a pollutant Greene County must be reactive to eliminate the pollutant source. Our approach begins with the above steps for identifying the source of the pollutant discharge then contacting and conferring with the property owner suspected of causing the illicit discharge, educating them about the harmful effects of the discharge they are causing and asking for cooperation in eliminating the discharge carrying pollutants. If voluntary compliance is not achieved, we can refer the violation to the Greene County Planning and Zoning Code Compliance Officer for enforcement. The Code Compliance Officer also can begin with an attempt to persuade the property owner to voluntarily comply with Article IV, Section 25 of the Greene County Zoning Regulations. If these efforts are not successful the Code Compliance Officer can refer the property owner to the Prosecuting Attorney's (PA) office. The PA will seek a judgement in court which would allow Greene County to hire a contractor to enter the property and abate the violation. Once the violation is abated, the County can seek to recoup the abatement expenses by assessing a property tax bill to the property owner.

4.2.3.1.8

As described in detail in the previous section, Greene County has the ability to refer a non-compliant property owner who is discharging identified pollutants via an illicit discharge to the Prosecuting Attorney's office for enforcement of Article IV, Section 25 of the Greene County Zoning Regulations. Article XXV of the Greene County Zoning Regulations (see Appendix B) details enforcement including monetary fines. However, the County has not issued fines. Court orders have sufficed to abate previous violations of other zoning regulations and would be the preferred method of addressing any pollutant carrying illicit discharges found in the future.

4.2.3.1.9

Greene County informs the public about the hazards of illicit discharges through a variety of methods that coordinate with our public education program (MCM #1) including:

- On-site wastewater system installer training
- Interpretive signs (*The Watershed Connection, Stormwater 101, Pervious Pavement, etc.*)
- Brochures (*Save Our Water Quality*)
- Fact Sheets (*Sinkholes, Springs, Farms and Streams, Maintaining Your OSW System*)

Note: All of the above listed publications can be found in Appendix E

4.2.3.1.10

Greene County has not identified any of the non-stormwater discharges listed in Section 1.2.2.2 of the permit to be significant contributors of pollutants into the County's MS4 system. These discharges are also listed in the County's illicit discharge ordinance in Article IV, Section 25(C)(4) of the Greene County Zoning Regulations (Appendix B). Should a future discharge from one of these sources ever be identified (through field observation and/or laboratory testing) as a significant source of pollutants to the County's MS4 system, conditions will be placed on the responsible party so as to minimize the discharge of pollutants.

Purpose and Expected Results

Greene County's illicit discharge detection and elimination program is intended to find and eliminate point sources of pollutants that can make their way into the County's MS4 system and then into the waterways used for recreation and drinking water. The purpose of the dry-weather field screening is to find any potential non-stormwater discharges that may be transporting pollutants into the County's MS4 system and eliminate those pollutant sources. The purpose of the County's certification requirement for on-site wastewater system installers is intended to ensure that wastewater effluent is adequately treated before reaching surface or groundwater. The educational efforts by Greene County and the educational partners we support (see Section 4.2.1) are meant to inform the public about how harmful to water quality discharging pollutants can be and what steps they can take to reduce pollution sources in stormwater. The purpose of the link on the Greene County website for reporting of pollution/spills/illicit discharges is to allow citizens a quick, convenient, and easy way to report possible pollutant sources. We expect this will enable us to investigate possible pollutant sources and take action if needed for locations that otherwise might be missed by the dry-weather screening.

The County expects that the cumulative result of the effective implementation of these multiple efforts will be the reduction in the amount of pollutants that enter surface and groundwater.

Measureable Goals

The County has had a certification program for on-site wastewater system installers since before the phase 2 MS4 permit was issued. The measureable goal for this program is to educate, certify, and re-certify when required, every person who installs on-site wastewater system in Greene County. The benefits of this program help protect water quality beyond the borders of Greene County since many of these installers work in surrounding counties as well.

Greene County's second measureable goal is to perform dry weather screening on at least 20% (147) of the 732 mapped outfalls per years. This will result in 100% (732) being screened over the permit period. Maps and coordinates for all outfall locations are included in Appendix G.

Primary Responsibility

Greene County's Environmental Compliance Manager is primarily responsible for coordinating the illicit discharge detection and elimination efforts in cooperation from the County's Water Quality Field Operations Manager and Water Quality Specialists who perform much of the on-site wastewater system installer training. The other educational activities are conducted and reported by the Greene County Resource Management Department and Watershed Committee of the Ozarks. Much of the educational

materials that have been developed are available online. Appendix E includes website links. Hard copies of material can be made available to MDNR upon request.

Iterative BMP Evaluation

If, in the future, any of the listed non-stormwater discharges are identified as a significant source of pollutants Greene County can place conditions/restrictions on such activities to minimize the discharge of pollutants. Should dry weather screening proceed faster than expected, or result in greater than expected numbers of illicit discharges being found, Greene County can increase the frequency of dry-weather screening to cover a greater percentage of the system annually.

4.2.4 Construction Site Storm Water Runoff Control

“The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to their regulated small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre shall be included in the program if that construction activity is part of a larger common plan of development or sales that would disturb one acre or more”.

4.2.4.1.1

Greene County adopted sediment and erosion control ordinances for construction sites on January 22, 1991 as a part of the County zoning regulations (Article IV Section 27 in Appendix B).

Article IV, Section 27 of the Greene County Zoning Regulations provides the local regulatory framework that governs land disturbance activities in Greene County. Section 114 of the Greene County Stormwater Design Standards provides greater detail on requirements that construction site operators must follow to comply with County regulations. Copies of Article IV, Section 27 of the Greene County Zoning Regulations and Section 114 of the Storm Water Design Standards are included in Appendices B and D respectively.

All non-agricultural land disturbance activities in Greene County require a Greene County grading permit regardless of area disturbed. The county can use discretion in waiving this requirement for sites disturbing less than one acre that do not pose a threat to a stream, sinkhole, spring or other sensitive natural feature. Before a grading permit is issued for any construction project the operator must submit the following documents to the Greene County Resource Management Department, Environmental Section:

1. Application for a Greene County Grading Permit (See Appendix H)
2. A grading and sediment and erosion control plan as part of their SWPPP
3. Completed SWPPP form (see the Greene County SWPPP Template in Appendix H)
(The SWPP template is available on Greene County’s website at https://greenecountymo.gov/resource_management/environmental/)
4. A security bond in the amount of \$1,000 per disturbed acre deposited with the Greene County Treasurer’s office for re-vegetation and BMP installation. The bond is returned once final stabilization has been approved. For subdivisions and commercial projects several other forms of security are accepted including a letter of credit from a lending institution naming Greene County as the beneficiary, a security agreement (see Appendix H), or withholding the final inspection and certificate of occupancy for a commercial building project.
5. A copy of the State Land Disturbance Permit if the site is disturbing greater than one acre.
6. A preconstruction meeting held on site with the contractor and/or owner is required prior to earth disturbance activities.

4.2.4.1.1.1

As stated above, Greene County’s construction site runoff (sediment and erosion control) regulations are found in Article IV, Section 27 of the Greene County Zoning Regulations. Section 114 of the Greene County Stormwater Design Standards provides greater detail on requirements that construction site operators must follow to comply with County regulations. Copies of Article IV, Section 27 of the Greene County Zoning Regulations and Section 114 of the Storm Water Design Standards are included in

Appendices B and D respectively.



Figure 17: Construction Site BMPs

Construction Site Runoff Control

All construction projects in Greene County are required to submit plans for review prior to commencing land disturbance activities. All land disturbance sites are regularly inspected by county staff for compliance with the submitted SWPPP. Violations are addressed in a variety of ways including stop-work orders, halting building inspections, withholding certificates of occupancy, and/or civil penalties

4.2.4.1.2

As summarized in section 4.2.4.1 above, all new developments greater than one acre are required to submit a SWPPP to the Greene County Resource Management Department for review and approval before work can begin. Greene County's SWPPP template is based on EPA's example SWPPP and is available on line for developers and contractors. Section 5 (page 14) of the SWPPP template requires developers and contractors to address non-sediment pollutants including, but not limited to: trash, fertilizers, pesticides, sanitary waste, and petroleum products. SWPPP developers are required to list potential pollutants on site and describe the best management practices that will be implemented to reduce the potential for stormwater pollution. MDNR's Publication 212: Response to Small Fuel Spills is also requested to be included in this section as guidance for petroleum product spills. The SWPPP must be completed and approved before Greene County will issue a grading permit for the project. During site inspections by County staff throughout the course of the project, these non-sediment control items are also checked to verify compliance with the SWPPP.

The Greene County SWPPP template is included in Appendix H.

4.2.4.1.3

All new developments and redevelopment projects are required to submit plans to the Greene County Resource Management Department for review. Plans are reviewed for compliance with all stormwater design standards including sediment and erosion control, and water quality consideration requirements. See Section 114.3.2 and 114.5.2 – 114.5.5 of the Storm Water Design Standards in Appendix D for erosion control design requirements. See also the Sediment and Erosion Control Regulation included in Article IV Section 27 of the Zoning Regulations (Appendix B). Water quality requirements are spelled out in Section 115 of the Greene County Stormwater Design Standards (see Appendix D). Greene County requires extended dry detention basins on all new developments to function as sediment control during active construction and as water quality basins for post-construction stormwater treatment. A more in-depth discussion of the post-construction water quality requirements can be found in section 4.2.5.1.1 of this SWMP. When written in 1999, the water quality requirements in Section 115 of the Greene County Stormwater Design Standards only applied to the Fulbright Spring and Pearson Creek watersheds since they are the drinking water source for much of the City of Springfield. On January 3, 2006 the Greene County Commission amended the Greene County Stormwater Design Standards to require permanent water quality practices on all developments in Greene County regardless of watershed location (See Planning Board Case 1625 in Appendix D).

All site plans are reviewed by the Stormwater Engineer to ensure conformity with the Greene County Stormwater Design Standards, including sediment control and water quality. See Section 103 of the Storm Water Design Standards in Appendix D for submittal requirements that provide a guideline for plan review. Review of the sediment and erosion control plan is performed by either the Environmental Compliance manager or the Water Quality Specialist as part of the SWPPP review. No grading permit and/or building permit are issued and the contractor cannot begin, until all reviewers are satisfied that the plans and SWPPP conform to Greene County requirements.

4.2.4.1.4

Before any proposed development can submit a preliminary plat they must present their proposal to the Greene County Zoning Board at a public hearing. Zoning hearings are posted 15 days in advance and adjoining landowners are contacted by personal courtesy letter. The hearings are a forum for the public to express their sentiment for, or against the proposed development. As required by Missouri Revised Statutes Chapter 64, the Greene County Zoning Board is required to hold public meetings when considering preliminary plat approval.

While land disturbance activities are ongoing, any citizen with a concern about erosion or runoff from the site can contact the Greene County Environmental Division directly via the website link on our web page as discussed in Section 4.2.3.1.3. The link on the webpage sends an email report directly to the Stormwater Engineer, the Environmental Compliance Manager, and the Water Quality Field Operations Manager. Any of these staff members can inspect, or direct one of the field inspectors to inspect the construction site. By applying for a grading permit, the applicant consents to Greene County staff inspecting the proposed development site and all work in progress (Article IV, Section 27(F)(1) of the Greene County Zoning Regulations found in Appendix B). The website for the erosion control reporting is at the following link: https://greenecountymo.gov/resource_management/environmental/

4.2.4.1.5

Both Article IV, Section 27 (A) of the Greene County Zoning Regulations and Section 114.3.1 of the Greene County Stormwater Design Standards require a grading permit for all non-agricultural land disturbance activities in Greene County (see Appendices B and D respectively). By applying for a grading permit, the applicant consents to Greene County staff inspecting the proposed development site and all work in progress as stated in Article IV, Section 27(F)(1) of the Greene County Zoning Regulations (Appendix B). The applicant must complete all the steps listed in section 4.2.4.1.1 above before a grading permit will be issued. Once a grading permit has been issued there are two stormwater inspectors on staff who perform site inspections to ensure compliance with the SWPPP and associated erosion control plan. An inspection frequency of every two to three weeks is the target for County staff to be on site. All weekly inspections in the interim are the responsibility of the contractor and/or



Figure 18: The Greene County Stormwater Engineer performing plan review

Stormwater Plan Review

All construction projects in Greene County are required to submit plans for review prior to commencing land disturbance activities. The Stormwater Engineer's review ensures the design conforms to the Greene County Stormwater Design Standards.

property owner. Site inspections by County staff are documented by entry into Greene County's permitting software which tracks all inspections for all permits issued including building permits, floodplain development permits and grading permits. This digital system allows us to maintain a permanent record of all site inspections performed. Inspectors are issued laptops which utilize wireless internet to connect to the County's server and document their inspections in the field. Photographs are also taken during most inspections to document the condition of the site, the location of any problem areas, and allow comparison with past conditions. All photographs are stored in digital format on the County's secure server. Previously, site inspections were documented by completing a checklist. This checklist is still provided to contractors and site owners as a means of fulfilling their required weekly inspection and is used as a guide for County staff.

Enforcement of erosion and sediment control measures is achieved through a variety of means that progress in formality and severity. Formalized penalties and civil enforcement for non-compliance with County sediment and erosion control regulations are detailed in Subsection F of Article IV, Section 27 (see Appendix B). A more complete discussion of the enforcement procedures for control measures is discussed in Section 4.2.4.1.6 below.

All sites are inspected on a routine basis of approximately once every two to three weeks. Some projects may be inspected more frequently due to size of disturbed area, proximity to sensitive features (stream, floodplain, sinkholes, spring, etc.). However, even the small sites are routinely inspected. Therefore Greene County prioritization is to include all sites on a regular basis.

4.2.4.1.5.1

Monitoring Plan: As stated above, all land disturbance sites are inspected for compliance with Greene County's erosion and sediment control requirements in Article IV, Section 27 of the Greene County Zoning Regulations and Section 114 of the Greene County Stormwater Design Standards.

All of the BMP's on the site plan and in the SWPPP are inspected on a regular basis by County staff on a schedule of approximately two to three weeks between visits. Inspection are more frequent for projects that disturb a large area, or have the potential to impact sensitive features. Additionally, Greene County provides inspection checklists for all site managers to perform the weekly inspections required by their individual site's MDNR land disturbance permit MO-RA00000. During the course of their routine visits, County staff check to ensure these weekly inspections are being documented properly.

4.2.4.1.6

Enforcement of erosion and sediment control measures is achieved through a variety of means that progress in formality and severity. Formalized penalties and civil enforcement for non-compliance with County sediment and erosion control regulations are detailed in Subsection F of Article IV, Section 27 (see Appendix B).

Greene County staff visit construction sites often enough that there is usually a good working relationship between staff and most contractors. If deficiencies or non-compliance issues are found during a site inspection by County staff can generally issue a verbal request to the site superintendent or General Contractor either in person or via a phone call to have the deficiency corrected. Written

notification can be sent through email if there is no one on site at the time of the inspection. In almost all cases, the contractor corrects the problem after the first verbal or email notification and the more formal steps outlined below are not needed. Should the noted deficiency not be resolved within the seven calendar days required by the SWPPP written notice can be sent to the property owner informing him/her that they are in violation of their grading permit and listing the corrective action that needs to be taken. A stop-work-order can also be posted on the site and work must cease until the deficiency is corrected. For subdivisions requiring a final plat to be recorded, the County can withhold acceptance of public improvements and does not record the final plat until all disturbed area has been stabilized with vegetation or other permanent cover. This prevents the developer from obtaining building permits for the newly formed lots until the development is stabilized with vegetative cover. In the event this step does not elicit the desired response, Greene County can utilize the money (security agreement, letter of credit, or cash) that is required as a performance bond as listed above in item number 4 in section 4.2.4.1.1. For commercial building sites that do not have platted lots the verbal and written communication and stop work orders can be utilized, but instead of withholding the final plat The Greene County Environmental Division can request the Greene County Building Regulations Division to withhold the final inspection and certificate of occupancy for the building. Since both of these divisions are within the Resource Management Department they work very closely together to enforce County regulations. On commercial projects, the Environmental Division must approve the site before a final inspection is performed by Building Regulations and the Environmental Division must have a grading permit ready (if one is required for a site) before Building Regulations will issue a commercial building permit. Conversely, the Environmental Division will not issue a grading permit for a commercial building site until Building Regulations is ready to issue the building permit. This synergistic approach allows for efficient enforcement of permitting requirements. Because of our ability to halt building inspections and deny building permits, or building inspections, it is very rare not to achieve compliance at this level for residential and commercial developments. If all else fails, the County can take the violation of the Zoning Regulations to court through the Greene County Counselor. However, the multiple layers of enforcement options and the many enforcement tools available to gain compliance means that we have not yet had to utilize bond money or take a project developer to court in order to enforce our construction site runoff control regulations. Any land disturbance violation observed by staff or reported by a citizen in the county outside the MS4 urbanized boundary, is also investigated and if necessary, corrective action is taken.

Purpose and Expected Results

The purpose of the Sediment and Erosion Control Regulations found in Article IV, Section 27 of the Greene County Planning and Zoning Regulations is to minimize the amount of sediment leaving active construction sites in stormwater runoff. The County's plan review and SWPPP review process are meant to ensure that each development has an effective plan in place guiding the owner and contractor on implementing practices that will reduce the amount of sediment leaving the site during construction. Inspections of each site by Greene County staff ensure that the site plan and SWPPP are implemented on site and if any failures in the sediment control practices occur, they are found, documented, and corrected in a timely manner. The County expects that the plan review and site inspection process that has been implemented will reduce the volume of sediment from land disturbance sites that reaches waters of the State of Missouri.

Measureable Goals

Greene County's first measureable goal is to review all site plans submitted for sites that require a grading permit (as defined in Section 114.3.1 of the Greene County Stormwater Design Standards in Appendix D).

Greene County also has the measureable goal of inspecting sites at least two times during the period the owner has coverage under a Greene County grading permit.

Primary Responsibility

Responsibility for implementing the Construction Site Stormwater Runoff Control minimum control measure is shared by the Greene County Stormwater Engineer, the Environmental Compliance Manager, and the Water Quality Specialist. The Greene County Stormwater engineer reviews all site plans for conformity with the Greene County Stormwater Design Standards. Both the Greene County Stormwater Engineer and the Environmental Compliance Manager review the Sediment and Erosion Control sheets of submitted plans. The Environmental Compliance Manager and Water Quality Specialist review the SWPPPs that are submitted and conduct preconstruction meetings and site inspections in the field. Grading permits are reviewed and written by the Environmental Compliance Manager or Water Quality Specialist then signed by the Stormwater Engineer.

Iterative BMP Evaluation

At least once every permit cycle Greene County will review the plan review and site inspection procedures to recommend any changes, or corrections that might be needed to improve the effectiveness of this MCM.

4.2.5 Post - Construction Storm Water Management in new Development and Redevelopment

“The permittee shall develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the permittee’s regulated small MS4. The permittees program shall ensure that controls are in place that have been designed and implemented to prevent or minimize water quality impacts”.

4.2.5.1.1

All new developments in Greene County are required by Article IV Section 25 of the Zoning Regulations (Appendix B) to provide storm water detention to limit post-construction peak discharges to the pre-construction rate or lower in an effort to match as closely as possible the pre-development discharge of the site. Section 112.5 of the Greene County Storm Water Design Standards gives detailed requirements for design storm discharge computations (See Appendix D). Discharge rates may not increase for the post development condition and computations must be submitted for the 50%, 10%, and 1% AEP (annual exceedance probability) storm to verify that this condition is met. Section 115.2 of the Storm Water Design Standards gives general design guidelines that recognize that the best pollutant reduction is to reduce the volume of runoff via practices such as minimization of DCIA (directly connected impervious area), and use of softer engineering practices such as vegetated swales and vegetated filters.

In addition to providing flood control, Section 115.4.1 specifies the required water quality treatment volume for all new developments and re-developments as the first ½ inch from DCIA or 1 inch in 24 hours, whichever volume is greater. For Springfield/Greene County the 90th percentile rainfall event defined as 1.0 inch of rainfall in Section 115.2.4. All permanent detention basins built in Greene County must provide outlet restriction sufficient to detain the required water quality volume and release it over a period of no less than 40 hours and no more than 72 hours as specified in Section 115.4.5 of the Greene County Storm Water Design Standards. This allows for some infiltration as well as greatly increased settlement of suspended solids and sediment borne pollutants.

Section 115 also encourages (without requiring) minimization of directly connected impervious area, maximization of hold time, utilizing a “treatment train” approach by utilizing BMP’s in series, and maximizing contact with vegetation through vegetated filter strips and grass swales. Section 115 of the Greene County Storm Water Design Standards was originally written to apply to the Pearson Creek watershed and the recharge area of Fulbright Spring, both drinking water sources for the Springfield/Greene County community. In 2006 the Greene County Commission expanded the requirements in Section 115 to all watersheds and all developments in the County (See Planning Board Case NO. 1625, January 3, 2006 in

Post-Construction Storm Water Management

All new and redevelopment projects in Greene County are required to provide water quality storage volume and restrict discharges to pre-development conditions. Basins must also utilize an outlet structure that discharges the detained water quality volume in 40-72 hours.



Figure 19: Extended dry detention basin with 40-72 hour hold time

Appendix D).

Article IV Section 10(G)(7) of the Greene County Missouri Subdivision Regulations (Appendix C) requires restrictive covenants to be filed for all new subdivision developments. These covenants govern the use and maintenance of the common areas, including detention basins. These covenants and restrictions are reviewed by the County Counselor prior to recording the final plat and must conform to Article XXIV, Section 4 of the Greene County Zoning Regulations (Appendix B) which require permanent BMP operation and maintenance in perpetuity. Section 6 of the same Article XXIV outlines the steps that may be taken by Greene County in the event the facilities within the common area are not maintained. This section gives Greene County the authority to enter the property for maintenance purposes.

4.2.5.1.2

As described above in section 4.2.5.1.1., Greene County requires restrictive covenants to ensure adequate long-term maintenance of detention/water quality basins located within common area of residential developments. The Greene County Stormwater Design Standards currently allow detention/water quality basins to be located within a single lot of a residential development. As currently written, the maintenance requirements in Greene County's regulations apply only to facilities within platted common area of residential developments not to single, privately owned lots. Within this permit cycle, Greene County intends to change this allowance and require all detention/water quality basins in residential developments to be held in platted common area to ensure adequate maintenance.

4.2.5.1.3

As stated above in Section 4.2.4.1.3, all commercial developments and residential subdivisions must submit plans for review by the Environmental Division to ensure compliance with the Greene County Stormwater Design Standards, and the Greene County Zoning Regulations. The plan review process is one of the non-structural best management practices Greene County utilizes to minimize water quality impacts of development. The items of focus during plan review are outlined in Section 103 of the Greene County Stormwater Design Standards in Appendix D. The plan review includes hydrology and hydraulics (detention volume, runoff rate, storm system capacity, water quality volume etc.), erosion and sediment control, wastewater treatment and site characteristics that need to be considered to protect water quality. Greene County sits on the Springfield Plateau which is underlain by Burlington-Keokuk limestone. This bedrock formation is highly karst with many sinkholes, caves, springs, and losing streams which are particularly sensitive to degradation of water quality. These features receive special consideration if they are present on a site prior to development.

Enforcement of sinkhole use restrictions found in Article IV, Section 28 of the Greene County Planning and Zoning Regulations and in Section 107 of the Greene County Storm Water Design Standards (Appendices B and D respectively). These regulations prohibit the filling of sinkholes, trash dumping and pollution within sinkholes, grading of sinkholes, wastewater treatment systems, and most construction within sinkholes. Setbacks from the sinkhole rim for specified activities are also included. Sinkholes are the natural conduits by which surface runoff reaches the shallow Springfield Plateau Aquifer which feeds our many springs that supply water to our streams. By keeping the sinkholes undisturbed we are preserving the existing hydrology of the sinkholes by allowing storm runoff to maintain its present flow paths. These regulations also protect the water quality of our shallow groundwater and the streams that

depend on springs for much of their baseflow.

As stated in section 4.2.5.1.1 above, Greene County requires all new development to provide both flood control detention and water quality capture volume as a structural BMP. In addition to plan review to ensure adequate volume and release rate, Greene County staff inspect the site during construction, and before final approval of construction (bond release or certificate of occupancy is issued (see section 4.2.4.1.6), an as-built survey is required to verify the detention/water quality basin has been built according to the approved design. The requirement for as-built surveys of detention/water quality structures is found in Section 103.1.6 of the Greene County Stormwater Design Standards (See Appendix D).

Article IV, Section 33 of the Greene County Zoning Regulations (Appendix B) spells out the urban services policy which is designed to direct growth to specific areas of the County. The urban services policy directs intense dense urban growth into a band around the City of Springfield where they can be served by gravity flow sanitary sewer. This policy prevents the proliferation of on-site wastewater treatment systems on small lots thus protecting groundwater quality.

Articles VI and VII of the Greene County Zoning Regulations (Appendix B) specify the minimum lot size that can be formed without being connected to public sanitary sewer. In Greene County, newly created lots must be 3 acres or more before on-site wastewater systems are allowed. This policy prevents on-site wastewater treatment systems on lots that are too small to support their use. This policy prevents concentrations of new on-site wastewater systems that have the potential to leak effluent into the groundwater or surface water systems. All other higher density residential zoning classifications (MH-1, UR-1, R-2, R-2, R-3, and R-4) as well as most commercial and manufacturing (C-2, M-1, M-2) require public sewer.

Non-structural BMP's in Greene County's program include:

- Zoning Regulations Article IV Sections 25, 27 and 28 (Appendix B)
 - Section 25 requires storm water detention for any new development
 - Section 27 regulates sediment and erosion control on new developments
 - Section 28 sets specific restrictions on development activities in sinkholes
- Subdivision Regulations Article V Section 6 (Appendix C)
 - Requires storm water detention, erosion control, and storm water BMPs
- Floodplain Management Regulations: Zoning Regulations Article XXI (Appendix B)

Sinkhole Use Restrictions

Sinkholes are a natural conduit for stormwater from the surface to directly reach groundwater in karst areas with little to no treatment from the soil. Greene County's sinkhole regulations help prevent pollution of the groundwater by protecting the quality of surface water entering the sinkhole.



Figure 20: Trash filled sinkhole collapse



Figure 21: Stable, protected sinkhole depression

-Prevents development in the floodway, and sets strict limits on floodplain encroachment in the absence of a stream buffer ordinance.

- Stormwater Design Standards Section 115 (Appendix D) encourages (but does not require):
 - minimization of directly connected impervious area
 - maximization of hold time
 - utilizing a “treatment train” approach by utilizing BMP’s in series
 - maximizing contact with vegetation through vegetated filter strips and grass swales

4.2.5.1.4

As stated in Section 4.2.5.1.3, Greene County inspects all structural BMPs (detention/water quality basins, open channels etc.) during construction of site improvements and requires as-built surveys to ensure conformance with approved plans. Greene County does not currently conduct any regular inspections on privately owned detention/water quality basins in residential or commercial developments after the site improvements have been approved. All existing detention/water quality structures have been mapped and inventoried in the County’s GIS database. This inventory is updated with each new plat that is recorded and with each new commercial project that is approved.

If regular inspections are to be required by the MS4 permit, Greene County will need to amend the existing Zoning Regulations to require agreements by developers that would allow Greene County staff access to the structural BMPs. The agreements would also need to specify enforcement procedures should maintenance be inadequate to maintain functionality of the BMP. Any ordinance that might be developed as a result of this permit requirement would apply to any development occurring after the ordinance is put in place. Greene County staff do not have authority to enter private property and any ordinance developed would not be retroactive to allow access to private property by County Staff. A review of the legal authority to enter into BMP maintenance agreements with developers will be conducted by County staff and the County Counselor by the end of the second year of this permit.

4.2.5.1.5

Greene County inspects all structural BMPs (detention/water quality basins, open channels etc.) during construction of site improvements and requires as-built surveys to ensure conformance with approved plans. Greene County does not currently conduct any regular inspections on privately owned detention/water quality basins in residential or commercial developments after the site improvements have been approved. If regular inspections are to be required by the MS4 permit, Greene County will need to amend the existing Zoning Regulations to require agreements by developers that would allow Greene County staff access to the structural BMPs, or would require the developer/any subsequent owner to inspect the BMP and keep records of the self-inspections.

Purpose and Expected Results

The purpose of Greene County’s post-construction stormwater management is to ensure that all new developments include practices in site design and construction that will continue to reduce pollutants in the long term after construction activities are complete. Greene County requires all new developments to provide water quality capture volume to be incorporated into extended dry detention basins. These basins increase residence time and encourage settling of suspended solids and associated pollutants. All

new development plans are reviewed to ensure that such features are included in the design and an as-built survey at the end of construction is required to verify that detention volumes, hold times, and release rates conform to the approved design. Greene County requires each new residential development to record covenants and restrictions which require water quality facilities in platted common area to maintain the functionality of these areas and gives the County the right to maintain the basin if the property owner's association does not. Restrictions on development in and around sinkholes reduces the potential for pollutants to go directly into the groundwater. Greene County expects that the procedures and policies that have been implemented will reduce the settleables and associated pollutants such as sediment, metals, hydrocarbons, floatable trash, etc. that reach the waters of the State of Missouri.

Measureable Goals

Greene County will continue to review all new development plans and give approval only after meeting all the applicable structural and non-structural post-construction requirements as described in the preceding sections.

Conduct a review of procedures for restrictive covenant approval and property owner formation to ensure the transition from the original developer to property owner's association.

Within the second year of the permit, County staff will review, with the Greene County Counselor's advice, the legal authority to require maintenance agreements and inspections on commercial developments/private property, and any ordinance changes that might be needed to enable such an ordinance in order to meet the requirements of this permit.

Primary Responsibility

Responsibility for implementing the Post-Construction Stormwater Runoff Control minimum control measure is shared by the Greene County Stormwater Engineer and the Director of the Greene County Planning and Zoning Department. The Greene County Stormwater engineer reviews all site plans for conformance with the Greene County Stormwater Design Standards and reviews-as-built surveys submitted at the completion of a development project. The Planning and Zoning Director approves the recording of covenants and restrictions with the final plat for all new residential developments.

Any future inspections of privately owned BMP's by County staff, or verifications of self-inspections by property owners, would be conducted by the Water Quality Specialist and Environmental Compliance Manager.

Iterative BMP Evaluation

During years one and two of this permit cycle Greene County will review procedures for restrictive covenant approval and property owner formation to ensure the transition from developer to property owner's association. The Greene County Counselor will need to review the County's legal authority to require maintenance agreements and inspections on commercial developments/private property. These reviews will be used to assess the current procedures used to fulfill this MCM and recommend any changes, or corrections that might be needed to improve the effectiveness of the County's program.

4.2.6 Pollution Prevention/Good Housekeeping for Municipal Operations

"The permittee shall develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations".

Municipal Operations Summary

The Greene County Highway Department (Highway Department) is responsible for all aspects of transportation network maintenance within the unincorporated areas of Greene County. Maintenance responsibilities include paving, culvert and bridge installation, street sweeping, snow removal, mowing and spraying along Greene County right of way and maintenance of stormwater infrastructure located within the right of way. The Highway Department maintains over 1,500 miles of paved road. The Highway Department is also responsible for maintaining the fleet of vehicles owned by the County including operation of a fueling station and a vehicle washing facility. The 14 acre Greene County Highway Department operations facility is located at 2065 N. Clifton Ave.

The Greene County Highway Department is under the authority of the Greene County Commission. Park facilities in Greene County are operated by the Springfield-Greene County Park Board, which functions as a department of the City of Springfield. The Highway Department facility and governmental campus constitute the only developed property owned by the County. All other property is undeveloped green space thus it does not contain potential pollution sources from operational activities.

4.2.6.1.1

Greene County Highway Department crews receive training on stormwater pollution prevention applicable to the specific task they perform. For example, snow plow operators receive training on salt use, storage, and clean-up and the road striping crew receives training on paint use, storage, and clean-up. Trainings are conducted at least once per calendar year, usually in coordination with a safety training conducted by the Highway Department's Safety Officer. Sign-in sheets are kept to document attendance by crew members.

4.2.6.1.2

The Greene County Highway Department does not own or operate any industrial facilities that are subject to NPDES permits for industrial stormwater discharge. The municipal operations performed by the Highway Department impacted by this operation and maintenance program are summarized below. Appendix I contains the Pollution Prevention /Good Housekeeping in Municipal Operations: Operation and Maintenance Manual developed by Greene County that gives procedural guidance for reducing Stormwater pollution from each of these operations. The O&M Manual provides greater detail for each of the municipal operations summarized below.

Salt Storage and Use

The Greene County Highway Department utilizes two salt storage facilities. There is a covered storage facility utilized jointly by the City of Springfield and Greene County located on Kaufman Road southwest of Springfield. An additional 1,300 tons of salt are also stored at the Highway Department's Clifton Ave facility in a covered barn protected from exposure to rainfall and runoff. Calcium Chloride is stored in above-ground containers at the Highway Department's Clifton Ave. facility.

Vehicle and Equipment Washing

Trucks, and heavy equipment are washed at the Highway Department Complex. All wash water from the vehicle wash at the Highway Department facility first enters a buried concrete separator tank with baffles for separation of floatable and settleable pollutants from the wash water. Effluent water is then sent into the Springfield sanitary sewer system and is not discharged into any stormwater conveyance system. Separated solids are periodically cleaned out (usually necessary once per year) and disposed of at the landfill.

Vehicle Fleet Maintenance

All vehicle maintenance is performed in covered garages with a total of 14 repair bays. All waste oil from vehicle maintenance operations is collected and pumped into a 1,000 gallon double walled storage tank and then purchased by a recycling company every two weeks on average. Likewise anti-freeze is collected for recycling. Machine parts are washed in hot baths with citrus solvent after which the wash water enters the sanitary sewer system.

Fuel Storage and Dispensing

Greene County has four FRP Clad Steel underground storage tanks (USTs) with a total capacity of 40,000 gallons of diesel fuel and 26,000 gallons of unleaded gasoline. The fuel system services all County vehicles. UST's are equipped with automatic leak monitoring systems. Fuel dispensers are equipped with automatic shutoff valves and a manual shutoff valve in case of an emergency. A more detailed discussion of fuel leak procedures is found in the Spill Prevention Control and Countermeasures Plan in Appendix I.

Herbicides and Chemicals

All herbicides, pesticides and other liquid chemicals are stored in a covered, locked, fire resistant cabinet protected from exposure to storm water runoff. When chemicals are mixed, the containers are triple-rinsed into the receiving tank. Empty containers are disposed of in accordance with the label directions. Granular, clay based, absorbent material is kept on hand at several stations around the facility for clean up of accidental spills of pesticides or petroleum products.

County Road and Special Projects

All land disturbance projects performed by or under contract to Greene County follow the same pollution prevention steps as are required for private developments. All

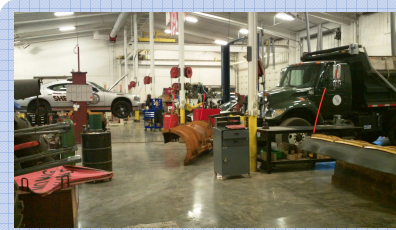


Figure 22: Vehicle repair bays



Figure 23: Cold mixing asphalt



Figure 24: Vehicle wash bay separator cleaning



Figure 25: Street sweeper



Figure 26: Clifton Facility salt storage barn

projects are covered under Greene County's State Land Disturbance Permit MOR1000040. A SWPPP is developed for each project disturbing more than one acre, along with a sediment and erosion control plan to include in the SWPPP. All projects have a full-time inspector who is responsible for ensuring BMPs installation, inspection, recordkeeping and other elements of SWPPP compliance. SWPPPs are reviewed and a Greene County grading permit is issued for County projects with the same criteria as private projects.

Street Sweeping and Trash Removal

All residential streets in the County (the bulk of those located in the regulated MS4 urbanized area) are routinely swept to reduce trash and floatables from entering the storm water system. All swept material is taken to the landfill. Each street is swept on a rotation that takes about four to six weeks. Trash from the County's two street sweepers is emptied daily into a dump truck and hauled to the landfill for proper disposal. Any trash found in roadside ditches is also collected and hauled to the landfill by highway department crews. Roadside Trash is also bagged by county jail inmate crews and collected by the highway department for transport to the landfill. Any hazardous materials, barrels or oil based materials are removed by a hazardous waste contractor. Street sweeping and trash collection activities remove approximately 280 tons of trash from County streets each year.

Road Maintenance and Cold Mix Mill

The Greene County Highway Department operates a cold mix asphalt plant for road repair and improvement. The operation runs mostly in the summer months and is located on Conco properties just east of Willard, Missouri. Oil at the site is trucked in each day of operation only for the amount of cold mix needed. No cold mix oil is stored at the mill site or at the Greene County Highway Department's Clifton Ave. facility. The cold mix mill is not often used.

4.2.6.1.3

As summarized in Section 4.2.6.1.2 above, and detailed in the Pollution Prevention /Good Housekeeping Operation and Maintenance Manual in Appendix I, Greene County has controls in place to reduce floatables and other pollutants from the MS4. The County's street sweeping trucks sweep all residential streets in unincorporated Greene County to remove accumulated trash and debris from the gutters and haul it to the landfill. Each fall the Highway Department's dump trucks are re-fitted with snow plows and ice spreading hoppers in preparation for winter. All salt spreading equipment is inspected and tested during the fall readiness drills to ensure functionality and spreading speed so that salt is spread evenly and not concentrated in one area. When not spreading salt on the road during a frozen precipitation event, all salt spreading equipped trucks are stored in covered bays to prevent contact with rainfall. At the beginning of spring, salt equipment is washed to remove the salt (wash water enters the sanitary sewer system) and stored in covered bays to prevent contact with rainfall. The Clifton facility is inspected monthly as part of the SPCC plan discussed further in Section 4.2.6.2.

4.2.6.1.4

As summarized in Section 4.2.6.1.2 above, and detailed in the Pollution Prevention /Good Housekeeping Operation and Maintenance Manual in Appendix I, Greene County has controls in place to reduce pollution from the listed functions applicable to Highway Department Operations. Weather is taken into consideration so that cold mix application and lane striping operations occur only during good weather

without the chance for rain. Roadside trash picked up by Highway Department and/or inmate crews is temporarily stored in a contained area at the Clifton Facility prior to being hauled to the landfill. All servicing of vehicles and equipment storage for vehicle maintenance is indoors and protected from contact with precipitation. Salt is stored in two separate facilities, at the Greene County Highway Department's facility at 2065 N. Clifton and at the joint City of Springfield/Greene County facility located at 3301 S. Kauffman Road. Both facilities are covered to protect salt from contact with precipitation. Greene County does not utilize snow disposal areas.

4.2.6.1.5

Disposal of waste and floatables is addressed in sections 4.2.6.1.2 and 4.2.6.1.3 of this SWMP document as well as the Operation and Maintenance Manual in Appendix I. The Greene County Highway Department does not remove dredged material or sediments from the MS4 area.

4.2.6.1.6

All flood management projects that might be undertaken by Greene County would be reviewed by the Storm Water Engineer to ensure consideration of water quality impacts. Review procedures are the same as described in Section 4.2.4.1.3 and 4.2.5.1.3 of this SWMP for private development projects.

Because Greene County participates in the National Flood Insurance Program (NFIP) Article XXI of the

Greene County Zoning Regulations (See Appendix B) sets strict guidelines for utilization of property in the floodplain. The floodplains in Greene County have been well regulated for many years, therefore projects undertaken by the County solely for flood control purposes are exceedingly rare.

Petroleum Product Spill Prevention, Control, and Countermeasures (SPCC) Plan

The petroleum products stored above ground at the Greene County Highway Department's Clifton Facility are subject to SPCC plan requirements found in 40 CFR 112.7. The SPCC Plan developed for the Clifton Facility addresses storage volumes and locations, flow paths, inspections and maintenance, as well as training, and emergency countermeasures procedures.



Figure 27: Clifton Facility Petroleum storage indoors with secondary containment

4.2.6.2

As summarized in Section 4.2.6.1.2 above, and detailed in the Pollution Prevention /Good Housekeeping

Operation and Maintenance Manual in Appendix I, Greene County stores paint for road striping either indoors, or outside in weatherproof containers during the peak summer season. Herbicides used in road maintenance are likewise stored indoors in fireproof lockers. Solvents used in vehicle maintenance are likewise stored and used indoors then collected for recycling.

Because the Greene County Highway Department's Clifton facility has above ground petroleum storage in aggregate greater than 1,320 gallons it is subject to 40 CFR 112 which requires the development of a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC plan developed for the County's Highway Department facility details the policies, secondary containment, and spill prevention procedures for petroleum products. The full SPCC Plan is included in Appendix I of this SWMP document. Petroleum products are stored indoors or otherwise protected from exposure to precipitation and runoff. Inspections of petroleum storage areas, including fuel dispensers, is

conducted monthly and the inspection reports are kept for a period of at least three years (SPCC plan Section 3.3.1). An example of a monthly inspection report is included on page 27 of 37 in the SPCC Plan included in Appendix I of this SWMP document.

Purpose and Expected Results

The purpose of Greene County's program for pollution prevention in municipal operations is to reduce the amount of pollutants reaching waters of the state from activities conducted by the Greene County Highway Department. The purpose of the street sweeping and trash removal from the right of way is to reduce floatable trash from the MS4. Covered salt storage and annual equipment readiness inspection of salt spreading equipment minimizes the amount of chlorides that are impacted by runoff from the Clifton facility and county roads. Maintenance of County fleet vehicles is done indoors and all petroleum and solvent products recycled to prevent oil and other hydrocarbons from being exposed to rainfall and runoff.

Greene County expects that the procedures and policies that have been implemented will reduce the settleables and associated pollutants such as sediment, metals, hydrocarbons, floatable trash, etc. from County operations that reach the waters of the State of Missouri.

Measureable Goals

Greene County Highway Department personnel will conduct annual inspections of all salt application/de-icing equipment to ensure proper functionality.

Greene County will continue to conduct monthly inspections of petroleum storage areas as required by the SPCC plan.

Annual education of crews will continue to be conducted to increase awareness of the role each Highway Department employee has in protecting water quality while performing his/her duties.

Primary Responsibility

Responsibility for implementing the Pollution Prevention/Good Housekeeping for Municipal Operations minimum control measure is shared by the Greene County Highway Department and the Greene County Resource Management Department. The Greene County Highway Department Safety Officer, with cooperation from the Environmental Compliance Manager conduct the stormwater pollution prevention trainings. Monthly inspections of the petroleum storage facilities is conducted by the Safety Officer.

Iterative BMP Evaluation

Greene County staff will conduct annual reviews of the Pollution Prevention/Good Housekeeping in Municipal Operations: Operation and Maintenance Manual as well as the Spill Prevention Control and Countermeasures Plan. These reviews will be used to assess the current procedures used to fulfill this MCM and recommend any changes, or corrections that might be needed to improve the effectiveness of the County's program.

4.2.7

Greene County has no plans to substitute the required BMPs with any alternative BMPs.

4.3

As noted in section 4.2.1.1 and 4.2.2.1.4 most of the activities included in Public Education and Outreach and the Springfield Greene County Integrated Plan (Public Involvement and Participation) are cooperative efforts between the City of Springfield, Greene County, and other non-profit water quality organizations. These activities are also a part of the Phase 1 MS4 permit for the City of Springfield. It is not the intention of Greene County to apply as a co-permittee with the City of Springfield, however we do work closely with them in developing similar programs and to coordinate the activities required by our respective permits.

4.4

The SWMP will be reviewed and updated in conjunction with preparation for the required biennial report.

5 Monitoring, Record Keeping and Reporting

5.1

Greene County has a contract with the Ozarks Environmental Water Resources Institute at Missouri State University for collection of water quality data. See section 3.1.2 for a detailed description of monitoring procedures. All sample data and laboratory analysis data (including sample date, sample parameters, analysis date, and analysis methodology are kept by Greene County for greater than the required three years. Quality Assurance/Quality Control (QA/QC) reports for laboratory analysis of water quality samples discussed in Section 3.1.1 have been included in all previous annual reports

5.2

Records of all permits and inspection reports are kept on file for the requisite time period in the offices of the Greene County Resource Management Department and are available for public inspection upon request during normal business hours.

Copies of the SWMP and general permit will be kept on file and will be available for inspection by the public or MDNR as required in the general permit

5.3

The SWMP report will be submitted to MDNR on a biennial basis as required by section 5.3.2. Greene County is not subject to a TMDL WLA and as such is not required to develop a TMDL ARAP. In accordance with the requirements of the general permit the annual report will contain all applicable requirements found in Sections 5.3.1.1 through 5.3.5.

REFERENCES

- Aley, Thomas and Thomson, Kenneth C., Hydrogeologic Mapping of Unincorporated Greene County, Missouri to Identify Areas where Sinkhole Flooding and Serious Groundwater Contamination Could Result from Land Development, Greene County Sewer District, Springfield, MO, 1981.
- Aley, Thomas and Thomson, Kenneth C., Septic Fields and the Protection of Groundwater Quality in Greene County, Missouri. Final Report, Ozarks Underground Laboratory, Protem, MO, 1984.
- Aley, Thomas and Thomson, Kenneth C., A Study of Septic Field Performance and Recharge Area Delineations for Twelve Spring Systems, Greene County, Missouri, Protem, MO, 2002.
- Bullard, L., Water Resources of Greene County, Watershed Committee of the Ozarks, Springfield, MO, 1997.
- Dove, Eric; Johnson, Kasi; and Keener, Matt, The Value of Protecting Ozark Streams An Economic Evaluation of Stream Bank Stability for Phosphorus Reduction, Springfield, MO, 2008.
- Emmett, Leo F. et al, Water Resources and Geology of the Springfield Area, Missouri, Missouri Division of Geology and Land Survey, Water Resources Report No. 34, Rolla, MO, 1978.
- Hayes, William C., Urban Development in a Karst Terrain - Springfield, Missouri, City of Springfield, Missouri, 1977.
- Kuehn, Ezekiel, Stream Bank Erosion Trends and Sediment Contributions in a Southwest Missouri River, Master's Thesis, Missouri state University, 2015.
- Ozarks Environmental Water Resources Institute, Pre-Construction Report for the Ward Branch Stream Restoration Project, Springfield, MO, 2007.
http://oewri.missouristate.edu/assets/OEWRI/Wards_Precon.pdf
- Thomson, Kenneth C., Ph.D., Geology of Greene County, Missouri, Watershed Management Coordinating Committee, Springfield, Missouri, 1986.
- Vandike, James E., Delineation of Recharge Areas for Seven Ozark Cavefish (*Amblyopsis*

Rosae) Sites in the Springfield Plateau of Southwestern Missouri, Missouri Division of Geology and Land Survey, Water Resources Program, Rolla, MO, 1989.

Waite, Loyd A. and Thomson, Kenneth C., Development, Description, and Application of a Geographic Information System Data Base for Water Resources in Karst Terrain in Greene County, Missouri, U.S. Geological Survey, Water Resources Investigations Report 93-4154, Rolla, MO. 1993.

Wright Water Engineers, Fulbright Spring Protection Study, Watershed Committee of the Ozarks, Springfield, Missouri, 1995.

\\Gcfilesvr1\pz\data\wp51\storm2\npdes\phase 2 regs\phase 2 permit\MS4 Program\2017-2021 New Permit\Storm Water Management Plan

APPENDICES

Note: In order to conserve both natural and monetary resources, hard copies are not included in these appendices for information that is publicly available online in electronic format. Website links are listed for such publicly available information referenced. Some materials are available from more than one source and an effort has been made to include as many of the website links as possible. Hard copies of all information can be made available to the Missouri Department of Natural Resources upon request.

This page intentionally left blank

APPENDIX A: TMDL Monitoring Program/ARAP

- EPA Approved TMDL for the James River in Webster, Greene, Christian, and Stone Counties, MO (2001)
<http://dnr.mo.gov/env/wpp/tmdl/docs/2347-2362-2365-james-r-tmdl.pdf>
- Update for the James River TMDL (2004)
<http://dnr.mo.gov/env/wpp/tmdl/docs/2347-2362-2365-james-r-update-12-04.pdf>
- EPA Approved TMDL for the Little Sac River Watershed (2006)
<http://dnr.mo.gov/env/wpp/tmdl/docs/1381-l-sac-r-tmdl.pdf>

This page intentionally left blank

APPENDIX B:

Greene County Zoning Regulations

- Article IV, Section 25: Storm Water Runoff
- Article IV, Section 27: Sediment and Erosion Control Regulations
- Article IV, Section 28: Sinkhole Use Standards
- Article IV, Section 33: The Urban Services Area
<https://greenecountymo.gov/files/PDF/file.pdf?id=1571>
- Article XXI: Floodplain Management Ordinance
<https://greenecountymo.gov/files/PDF/file.pdf?id=1588>
- Article XXV: Enforcement
<https://greenecountymo.gov/files/PDF/file.pdf?id=1593>
- Article XXIV: Common Open Space and Common Improvement Regulations
<https://greenecountymo.gov/files/PDF/file.pdf?id=1591>
- Article VI: A-R Agricultural-Residential District (Section 6)
<https://greenecountymo.gov/files/PDF/file.pdf?id=1574>
- Article VII: RR-1 Rural Residence District (Section 6)
<https://greenecountymo.gov/files/PDF/file.pdf?id=1575>

This page intentionally left blank

APPENDIX C:

Greene County Missouri Subdivision Regulations

- Article IV, Section 10: Final Plat Approval
<https://greenecountymo.gov/files/PDF/file.pdf?id=2198>
- Article V, Section 6: Storm Drainage
<https://greenecountymo.gov/files/PDF/file.pdf?id=2198>

This page intentionally left blank

APPENDIX D:

Greene County Stormwater Design Standards

- Section 103: Drawings and Calculations
<https://greenecountymo.gov/files/files.php?id=1552>
- Section 107: Sinkholes and Karst Features
<https://greenecountymo.gov/files/files.php?id=1554>
- Section 112: Detention Facilities for Flood Control
<https://greenecountymo.gov/files/files.php?id=1559>
- Section 114: Erosion and Sediment Control
<https://greenecountymo.gov/files/files.php?id=1560>
- Section 115: Water Quality Protection
<https://greenecountymo.gov/files/files.php?id=1561>
- Planning Board Case No. 1625

**ORDER
OF THE
GREENE COUNTY COMMISSION
SPRINGFIELD, MISSOURI**

DATE ISSUED: January 3, 2006

SUBJECT: AMENDMENT TO THE GREENE COUNTY STORMWATER
DESIGN STANDARDS

PLANNING BOARD CASE NO. 1625

TEXT: Amend the Greene County Stormwater Design Standards

The Greene County Planning Board did, during public hearing on December 20, 2005, vote unanimously to recommend approval of this request.

Now, therefore, the Greene County Commission did this day, upon a motion by Commissioner Bentley, seconded by Commissioner Bengsch, and with Commissioner Coonrod concurring, vote to amend the Greene County Stormwater Design Standards as follows:

Amendments to Section 115, Water Quality Protection, of the Greene County Stormwater Design Standards extending requirements to provide water quality best management practices (BMPs) to developments in all watersheds of the county. Water quality BMPs are currently required only in the Fulbright Spring and Pearson Creek watersheds.

Amend Section 115 - Water Quality Protection of the Greene County Stormwater Design Standards as follows:

Section 115.1 PURPOSE

This section covers the design of Best Management Practices (BMPs) to minimize the adverse effects of urban stormwater runoff on the quality of receiving waters. This policy applies only to developments in the residential, commercial, office, and manufacturing (R, C, O, and M) zoning districts and Plot Assignment Districts (P.A.D.'s) or other special zoning districts meeting or exceeding the development densities allowed in the R, C, O, and M districts. It does not apply to [RR-1, Rural Residence District,] A-R, Agriculture-Residence District or the A-1, Agriculture District.

~~[The Greene County Northeast Development Plan identifies Fulbright Spring and Pierson Creek as valuable resource waters which are sources of the community's water supply. The Northeast Plan, as well as the Short Range Recommendations of the Watershed Task Force endorsed by the County Commission in September 1996, call for protection of these water resources by implementing the recommendations of the 1995 Fulbright Spring Protection Study (Reference 115.1). The requirements of this section will apply to all new developments in these watersheds.~~

~~As the role which urban runoff from the Springfield metropolitan area plays in the quality of the James River and Table Rock Lake becomes better understood, it is anticipated that water quality requirements will be extended to watersheds of the James River and its tributaries.]~~

It is recognized that specific water quality standards, other than those contained in the Missouri Clean Water Laws, have not been developed or adopted for these receiving waters. The objective of this policy is not to meet specific reductions of targeted pollutants, but rather to provide a generally effective level of pollutant removal by using reasonable, cost effective measures. The goal is to minimize, to the maximum extent practical, adverse impacts on the quality of the

receiving waters.

Section 115.3 REQUIREMENTS

The following requirements will apply to any new development within the [~~Fulbright Spring or Pierson Creek watersheds:~~] [Zoning Districts listed in Section 115.1.]

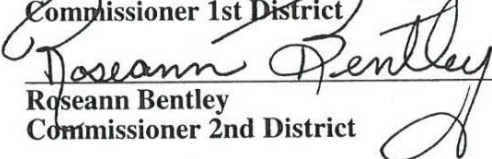
Done this 3rd day of January, 2006
THE GREENE COUNTY COMMISSION



David L. Coonrod
Presiding Commissioner



Harold Bengsch
Commissioner 1st District



Roseann Bentley
Commissioner 2nd District

M:\data\wp51\corder\pb court orders 2006\pb court order 06\1625 stormwater design.wpd

This page intentionally left blank

APPENDIX E:

Public Education & Outreach Materials

Non Profit Partnership Organizations

- The Watershed Committee of the Ozarks
<http://www.watershedcommittee.org/>
- The James River Basin Partnership
<http://www.jamesriverbasin.com/>
- Project WET (Water Education for Teachers)
<http://projectwet.missouristate.edu/>

Handouts and Brochures

- Watershed Committee Brochure
<http://watershedcommittee.org/wp-content/uploads/2013/10/wco-brochure-web-lowres.pdf>
- Create a Rain Garden
<http://www.watershedcommittee.org/wp-content/uploads/2010/08/brochure-rain-garden1.pdf>
- How to Make a Rain Barrel
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/rain-barrell-brochure-rev1.pdf>
- Save Our Water Quality
<http://www.watershedcommittee.org/wp-content/uploads/2010/10/saveourwaterquality.pdf>
- Sinkholes
<http://watershedcommittee.org/wp-content/uploads/2017/02/WCO-Sinkholes-Factsheet.pdf>
<https://greencountymo.gov/files/PDF/file.pdf?id=1550>
- Springs
<http://watershedcommittee.org/wp-content/uploads/2017/02/WCO-Springs-Factsheet.pdf>
<https://greencountymo.gov/files/PDF/file.pdf?id=31019>
- How to Protect Your Well
http://watershedcommittee.org/wp-content/uploads/2016/08/ProtectYourWell_updated.pdf
- Farms and Streams

- <http://watershedcommittee.org/wp-content/uploads/2017/02/WCO-Farms-Factsheet.pdf>
<https://greencountymo.gov/files/PDF/file.pdf?id=31020>
- Maintaining Your On-Site Wastewater Treatment System
http://watershedcommittee.org/wp-content/uploads/2011/11/Maintaining-OWTS_updated.pdf
<https://greencountymo.gov/files/PDF/file.pdf?id=1547>
- Maintaining Your Pump to Gravity System
http://watershedcommittee.org/wp-content/uploads/2011/11/Pump-to-Gravity_updated.pdf
<https://greencountymo.gov/files/PDF/file.pdf?id=1546>
- Maintaining Your Wastewater Lagoon System
http://watershedcommittee.org/wp-content/uploads/2011/11/Lagoon-System_updated.pdf
<https://greencountymo.gov/files/PDF/file.pdf?id=1544>
- Maintaining Your Onsite Wastewater Drip System
http://watershedcommittee.org/wp-content/uploads/2011/11/Maintaining-Drip-System_updated.pdf
<https://greencountymo.gov/files/PDF/file.pdf?id=1548>
- Maintaining Your Low Pressure Pipe System
http://watershedcommittee.org/wp-content/uploads/2011/11/Maintaining-Low-Pressure-Pipe_updated.pdf
<https://greencountymo.gov/files/PDF/file.pdf?id=1545>

Informational Signage at the Watershed Center

- The Watershed Connection
<http://www.watershedcommittee.org/wp-content/uploads/2010/11/watershed-connection.pdf>
- Forests and Watersheds
<http://www.watershedcommittee.org/wp-content/uploads/2008/11/forests-and-watersheds.pdf>
- Lakeside Biology
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/lake-biology-lakeside.pdf>
- Healthy Water: Healthy People
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/healthy-water-people.pdf>
- Springside Biology
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/springside-learning-station.pdf>
- Native Vegetation
<http://www.watershedcommittee.org/wp-content/uploads/2008/08/native-vegetation.pdf>

- Stream Health and Monitoring
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/stream-health-monitoring.pdf>
- Stormwater 101
<http://www.watershedcommittee.org/wp-content/uploads/2008/06/stormwater-101-sign.pdf>

This page intentionally left blank

APPENDIX F:

Public Involvement/Participation Materials

- Springfield – Greene County Integrated Plan for the Environment
<http://springfieldintegratedplan.com/>
- Environmental Priorities Task Force Final Report
<http://springfieldintegratedplan.com/wp-content/uploads/pdfs/recommendations/epTaskForceFinalReport020415.pdf>

This page intentionally left blank

APPENDIX G:

Illicit Discharge Detection and Elimination

- Greene County Regulations and Standards for On-Site Wastewater Systems
<https://greenecountymo.gov/files/files.php?id=1540>
- Greene County pollution reporting web page
https://greenecountymo.gov/resource_management/environmental/
- Planning Board Case 1827
- Dry weather outfall screening locations: list and coordinates
- Dry weather outfall screening locations maps
- Map of MS4 areas not served by municipal sanitary sewer

**ORDER
OF THE
GREENE COUNTY COMMISSION
SPRINGFIELD, MISSOURI**

DATE ISSUED: SEPTEMBER 4, 2012

SUBJECT: PLANNING BOARD CASE NO. 1827

TEXT: The Greene County Planning Office submitted to the Greene County Planning Board for review and recommendation to the Greene County Commission the following Amendment to the Greene County Zoning Regulations:

Amend Article IV Special Provisions, Section 25 Stormwater Runoff by adding Subsection C and inserting the following regulations concerning illicit discharge into the County's Stormwater system and renumbering the regulations accordingly.

Section C. Illicit Discharge Detection and Elimination

(1) Purpose: This ordinance is adopted pursuant to the authority granted in 64.907, 64.825 –64.885, Revised Statutes of Missouri and are intended to regulate non-stormwater discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are:

- A. To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user**

- B. To prohibit Illicit Connections and Discharges to the MS4
 - C. To establish legal authority to carry out all inspection, and monitoring procedures necessary to ensure compliance with this ordinance
- (2) **Applicability:** This ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands unless explicitly exempted.
- (3) **Ultimate Responsibility:** The standards set forth in this article and promulgated pursuant to this article are minimum standards. Compliance with this article does not insure that there will be no contamination, pollution or unauthorized discharge of pollutants into the waters of the United States. This article shall not create liability on the part of the County or any agent or employee of the County for any damages that result from any discharges, reliance on this article or any administrative decision made under this article.
- (4) **Illegal Discharges:** It shall be unlawful for any person to discharge or cause to be discharged into the municipal separate storm sewer system or into any watercourse any material other than stormwater. The following discharges are exempt from the prohibitions established by this article:
- A. Waterline flushing or other potable water sources;
 - B. Landscape irrigation or lawn watering;
 - C. Diverted stream flows;
 - D. Rising groundwater;
 - E. Groundwater infiltration;
 - F. Uncontaminated pumped groundwater;
 - G. Foundation or footing drains excluding active groundwater de-watering systems;
 - H. Crawlspace pumps, air conditioning condensation;
 - I. Springs;
 - J. Non-commercial washing of vehicles;
 - K. Natural riparian habitat or wetland flows;
 - L. Swimming pools if de-chlorinated to less than 1 ppm chlorine;
 - M. Fire fighting activities;
 - N. Other water not containing pollutants;
 - O. Discharges specified by the County as necessary to protect public health and safety;
 - P. Dye testing if notification is given to the County before the test; and
 - Q. Any non-storm water discharge permitted under an NPDES permit, waiver or waste discharge order issued to the discharger and administered under the authority of the Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the municipal separate storm sewer system.

- (5) **Illicit connections:** It shall be unlawful for any person to construct, use, maintain or have an illicit connection.
- (6) **Waste disposal prohibitions:** It shall be unlawful for any person to place, deposit or dump or to cause or allow the placing, depositing or dumping any refuse, rubbish, yard waste, paper litter or other discarded or abandoned objects, articles and accumulations containing pollutants into the municipal separate storm sewer system or into any waterway.
- (7) **Connection of sanitary sewer prohibited:** It shall be unlawful for any person to connect a line conveying sewage to the municipal separate storm sewer system or to allow such a connection to continue.
- (8) **Industrial or construction activity discharges:** It shall be unlawful for any person subject to an industrial activity or construction NPDES storm water discharge permit to fail to comply with all provisions of such permit.
- (9) **Notification of Spills:**

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the County in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the County within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

The Greene County Planning Board did, during public hearing on June 19, 2012 vote to table this amendment to allow additional time for public comment.

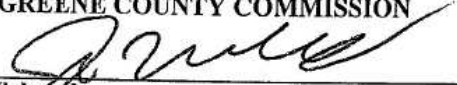
The Greene County Planning Board did, during public hearing on July 17, 2012 vote to table this amendment to allow additional time for public comment.

The Greene County Planning Board did vote during public hearing on August 21, 2012 to recommend approval of this amendment.

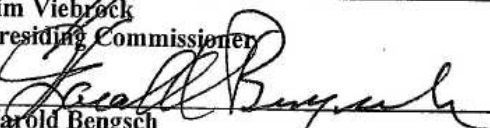
Now, therefore, the Greene County Commission did this day, upon a motion by Commissioner Viebrock, seconded by Commissioner Bengsch, and with Commissioner Bentley concurring, vote to approve this request.

Done this 4th day of September, 2012

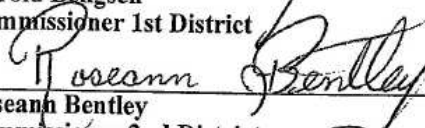
THE GREENE COUNTY COMMISSION



Jim Viebrock
Presiding Commissioner



Harold Bengsch
Commissioner 1st District



Roseann Bentley
Commissioner 2nd District

M:\PZ\data\wp51\corder\pb court orders 2012\pb 1827 co.doc

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
1	SOUTH DRY SAC	93° 17' 1.475" W	37° 16' 38.328" N	474845	4125674	SE-31-30-21
2	WILSON CREEK	93° 22' 24.758" W	37° 11' 4.920" N	466844	4115427	SE-30-29-22
3	WILSON CREEK	93° 21' 34.704" W	37° 10' 31.888" N	468074	4114404	SW-32-29-22
4	SOUTH CREEK	93° 20' 42.948" W	37° 9' 55.938" N	469346	4113292	NW-04-28-22
5	PEARSON CREEK	93° 12' 17.216" W	37° 13' 13.060" N	481831	4119330	NW-14-29-21
6	INMAN CREEK	93° 19' 32.954" W	37° 9' 15.011" N	471068	4112024	SW-03-28-22
7	INMAN CREEK	93° 19' 25.086" W	37° 9' 15.051" N	471262	4112025	SW-03-28-22
8	INMAN CREEK	93° 20' 20.623" W	37° 8' 44.132" N	469889	4111077	SE-09-28-22
9	INMAN CREEK	93° 20' 31.011" W	37° 9' 21.484" N	469637	4112229	SW-04-28-22
10	INMAN CREEK	93° 20' 43.231" W	37° 9' 19.932" N	469335	4112182	SW-04-28-22
11	INMAN CREEK	93° 20' 57.983" W	37° 9' 14.373" N	468970	4112012	SW-04-28-22
12	INMAN CREEK	93° 20' 56.276" W	37° 9' 25.428" N	469014	4112353	SW-04-28-22
13	INMAN CREEK	93° 21' 2.704" W	37° 9' 9.157" N	468853	4111852	NE-08-28-22
14	WILSON CREEK	93° 21' 24.100" W	37° 8' 55.359" N	468324	4111429	NE-08-28-22
15	INMAN CREEK	93° 21' 7.782" W	37° 9' 3.150" N	468728	4111667	NE-08-28-22
16	PEARSON CREEK	93° 11' 5.785" W	37° 13' 47.745" N	483594	4120395	SW-12-29-21
17	WILSON CREEK	93° 21' 49.281" W	37° 8' 35.179" N	467701	4110809	SW-08-28-22
18	PEARSON CREEK	93° 10' 17.521" W	37° 13' 46.747" N	484783	4120362	SE-12-29-21
19	WILSON CREEK	93° 21' 36.292" W	37° 8' 16.536" N	468019	4110233	NE-17-28-22
20	WILSON CREEK	93° 21' 31.742" W	37° 8' 28.885" N	468132	4110613	SE-08-28-22
21	WILSON CREEK	93° 21' 18.564" W	37° 8' 32.650" N	468458	4110728	SE-08-28-22
22	WILSON CREEK	93° 21' 5.511" W	37° 8' 19.686" N	468779	4110328	SE-08-28-22
25*	WILSON CREEK	93° 21' 26.531" W	37° 8' 1.505" N	468258	4109769	NE-17-28-22
26	WILSON CREEK	93° 21' 20.310" W	37° 7' 59.309" N	468411	4109701	NE-17-28-22
27	WILSON CREEK	93° 21' 28.821" W	37° 7' 34.237" N	468198	4108929	SE-17-28-22
28	WILSON CREEK	93° 21' 7.131" W	37° 7' 52.816" N	468736	4109500	NE-17-28-22
29	WARD BRANCH	93° 19' 37.799" W	37° 7' 56.412" N	470940	4109603	NW-15-28-22
30	WARD BRANCH	93° 19' 37.598" W	37° 7' 56.088" N	470945	4109593	NW-15-28-22
31	WARD BRANCH	93° 19' 47.824" W	37° 7' 22.050" N	470689	4108545	NW-22-28-22
32	WARD BRANCH	93° 19' 51.598" W	37° 7' 17.938" N	470595	4108418	NW-22-28-22
33	WARD BRANCH	93° 19' 50.702" W	37° 7' 9.203" N	470617	4108149	NW-22-28-22
35*	WARD BRANCH	93° 19' 11.491" W	37° 7' 30.175" N	471586	4108792	SE-15-28-22
36	WARD BRANCH	93° 20' 19.221" W	37° 7' 10.727" N	469913	4108198	NE-21-28-22
37	WARD BRANCH	93° 18' 17.740" W	37° 7' 31.560" N	472913	4108830	SE-14-28-22
38	WARD BRANCH	93° 18' 47.181" W	37° 7' 22.875" N	472185	4108565	NW-23-28-22
39	WARD BRANCH	93° 18' 37.306" W	37° 7' 8.762" N	472428	4108129	NW-23-28-22
40	WARD BRANCH	93° 18' 10.235" W	37° 6' 51.576" N	473094	4107598	SE-23-28-22
41	WARD BRANCH	93° 18' 8.543" W	37° 6' 57.803" N	473136	4107789	SE-23-28-22
42	WARD BRANCH	93° 18' 32.066" W	37° 7' 1.710" N	472556	4107912	NW-23-28-22
43	WARD BRANCH	93° 18' 44.981" W	37° 6' 54.780" N	472237	4107699	SW-23-28-22
44	PEARSON CREEK	93° 12' 17.124" W	37° 12' 57.184" N	481833	4118841	SW-14-29-21
45	WARD BRANCH	93° 18' 32.541" W	37° 6' 44.890" N	472543	4107393	SW-23-28-22
46	WARD BRANCH	93° 18' 27.234" W	37° 6' 39.387" N	472673	4107223	SW-23-28-22
47	WARD BRANCH	93° 18' 26.962" W	37° 6' 40.588" N	472680	4107260	SW-23-28-22
48	JAMES RIVER	93° 17' 58.250" W	37° 6' 35.838" N	473388	4107112	SE-23-28-22
49	JAMES RIVER	93° 17' 11.303" W	37° 6' 27.399" N	474546	4106848	NE-25-28-22
50	JAMES RIVER	93° 16' 56.674" W	37° 6' 53.412" N	474910	4107649	SE-24-28-22
51	JAMES RIVER	93° 16' 43.304" W	37° 6' 51.109" N	475239	4107577	SW-19-28-21

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
52	JAMES RIVER	93° 13' 16.490" W	37° 9' 2.050" N	480353	4111598	SW-03-28-21
53	PEARSON CREEK	93° 12' 13.882" W	37° 9' 56.845" N	481901	4113283	SW-35-29-21
54	PEARSON CREEK	93° 12' 29.332" W	37° 10' 17.366" N	481521	4113916	SE-34-29-21
55	PEARSON CREEK	93° 12' 27.587" W	37° 10' 23.460" N	481564	4114104	NW-35-29-21
56	PEARSON CREEK	93° 12' 19.428" W	37° 10' 40.746" N	481767	4114636	NW-35-29-21
57	PEARSON CREEK	93° 12' 18.197" W	37° 10' 41.092" N	481797	4114647	NW-35-29-21
58	PEARSON CREEK	93° 12' 18.349" W	37° 10' 50.714" N	481794	4114943	SW-26-29-21
59	PEARSON CREEK	93° 12' 28.527" W	37° 10' 49.142" N	481543	4114896	SE-27-29-21
60	PEARSON CREEK	93° 12' 45.109" W	37° 10' 40.870" N	481134	4114642	NE-34-29-21
61	PEARSON CREEK	93° 12' 23.776" W	37° 11' 1.405" N	481661	4115273	SW-26-29-21
62	PEARSON CREEK	93° 11' 21.132" W	37° 11' 50.915" N	483209	4116796	SE-23-29-21
63	SOUTH DRY SAC	93° 16' 17.959" W	37° 16' 8.443" N	475914	4124749	W 1/2 LOT 6-06-29-21
64	PEARSON CREEK	93° 10' 53.007" W	37° 13' 49.772" N	483909	4120457	NW-12-29-21
65	WARD BRANCH	93° 19' 56.101" W	37° 8' 2.601" N	470489	4109795	NW-15-28-22
66	JAMES RIVER	93° 20' 43.904" W	37° 7' 25.931" N	469306	4108669	NW-21-28-22
67	WILSON CREEK	93° 21' 9.247" W	37° 8' 18.296" N	468686	4110285	NE-17-28-22
68	WILSON CREEK	93° 22' 18.788" W	37° 11' 4.110" N	466991	4115401	SE-30-29-22
69	WILSON CREEK	93° 22' 12.248" W	37° 11' 3.587" N	467152	4115385	SE-30-29-22
70	WILSON CREEK	93° 22' 8.471" W	37° 11' 9.436" N	467246	4115564	SE-30-29-22
71	WILSON CREEK	93° 22' 15.645" W	37° 11' 2.893" N	467068	4115364	SE-30-29-22
72	WILSON CREEK	93° 22' 17.748" W	37° 10' 53.435" N	467015	4115072	NE-31-29-22
73	WILSON CREEK	93° 21' 45.481" W	37° 11' 45.205" N	467817	4116665	NW-29-29-22
74	WILSON CREEK	93° 21' 36.425" W	37° 11' 46.290" N	468040	4116697	NW-29-29-22
75	WILSON CREEK	93° 21' 37.133" W	37° 11' 48.453" N	468023	4116764	NW-29-29-22
76	WILSON CREEK	93° 21' 46.432" W	37° 10' 32.300" N	467785	4114418	SW-32-29-22
77	WILSON CREEK	93° 21' 34.654" W	37° 10' 32.356" N	468075	4114419	SW-32-29-22
78	WILSON CREEK	93° 21' 47.051" W	37° 10' 20.353" N	467768	4114050	SW-32-29-22
79	PEARSON CREEK	93° 12' 22.238" W	37° 13' 38.175" N	481709	4120104	SW-11-29-21
80	PEARSON CREEK	93° 12' 19.593" W	37° 13' 23.995" N	481774	4119667	NW-14-29-21
81	PEARSON CREEK	93° 11' 6.940" W	37° 13' 45.181" N	483565	4120316	SW-12-29-21
82	PEARSON CREEK	93° 12' 57.228" W	37° 12' 53.201" N	480844	4118720	SE-15-29-21
83	PEARSON CREEK	93° 12' 51.530" W	37° 12' 50.933" N	480984	4118650	SE-15-29-21
84	PEARSON CREEK	93° 12' 48.693" W	37° 12' 48.167" N	481054	4118565	SE-15-29-21
85	PEARSON CREEK	93° 12' 43.846" W	37° 12' 47.399" N	481173	4118541	SE-15-29-21
86	PEARSON CREEK	93° 12' 8.113" W	37° 11' 56.102" N	482051	4116958	SW-23-29-21
87	PEARSON CREEK	93° 11' 45.331" W	37° 11' 48.682" N	482612	4116728	SE-23-29-21
88	PEARSON CREEK	93° 11' 44.108" W	37° 11' 47.062" N	482642	4116678	SE-23-29-21
89	PEARSON CREEK	93° 11' 21.734" W	37° 12' 5.098" N	483195	4117233	NE-23-29-21
90	PEARSON CREEK	93° 11' 13.959" W	37° 11' 56.377" N	483386	4116964	SW-24-29-21
91	PEARSON CREEK	93° 11' 13.952" W	37° 11' 58.263" N	483386	4117022	SW-24-29-21
92	PEARSON CREEK	93° 11' 12.840" W	37° 11' 59.403" N	483413	4117057	SW-24-29-21
93	PEARSON CREEK	93° 11' 17.673" W	37° 12' 4.452" N	483295	4117213	NW-24-29-21
94	PEARSON CREEK	93° 11' 18.323" W	37° 12' 5.048" N	483279	4117231	NW-24-29-21
95	PEARSON CREEK	93° 11' 18.994" W	37° 12' 8.277" N	483262	4117331	NW-24-29-21
96	PEARSON CREEK	93° 11' 5.552" W	37° 12' 7.885" N	483594	4117318	NW-24-29-21
97	PEARSON CREEK	93° 11' 4.313" W	37° 12' 7.887" N	483624	4117318	NW-24-29-21
98	PEARSON CREEK	93° 11' 3.976" W	37° 12' 13.761" N	483633	4117499	NW-24-29-21
99	PEARSON CREEK	93° 11' 17.822" W	37° 12' 15.584" N	483292	4117556	NW-24-29-21

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
100	PEARSON CREEK	93° 11' 16.580" W	37° 12' 16.709" N	483322	4117590	NW-24-29-21
101	PEARSON CREEK	93° 11' 15.352" W	37° 11' 58.863" N	483352	4117040	SW-24-29-21
102	WILSON CREEK	93° 22' 43.434" W	37° 11' 0.125" N	466382	4115281	SW-30-29-22
103	PEARSON CREEK	93° 12' 32.887" W	37° 11' 15.973" N	481437	4115723	NE-27-29-21
104	PEARSON CREEK	93° 12' 12.592" W	37° 11' 8.273" N	481937	4115484	SW-26-29-21
105	PEARSON CREEK	93° 12' 21.932" W	37° 10' 55.146" N	481706	4115080	SW-26-29-21
106	PEARSON CREEK	93° 12' 12.590" W	37° 10' 50.645" N	481936	4114941	SW-26-29-21
107	PEARSON CREEK	93° 12' 31.880" W	37° 10' 52.129" N	481461	4114988	SE-27-29-21
108	PEARSON CREEK	93° 12' 45.058" W	37° 10' 46.890" N	481135	4114827	NE-34-29-21
109	PEARSON CREEK	93° 12' 52.660" W	37° 10' 39.880" N	480947	4114611	NE-34-29-21
110	PEARSON CREEK	93° 12' 30.232" W	37° 10' 44.864" N	481501	4114764	NE-34-29-21
111	PEARSON CREEK	93° 12' 31.608" W	37° 10' 45.372" N	481467	4114780	NE-34-29-21
112	PEARSON CREEK	93° 12' 14.295" W	37° 10' 36.191" N	481893	4114496	NW-35-29-21
113	PEARSON CREEK	93° 12' 29.204" W	37° 10' 15.702" N	481524	4113865	SE-34-29-21
114	PEARSON CREEK	93° 12' 34.173" W	37° 10' 9.783" N	481401	4113683	SE-34-29-21
115	PEARSON CREEK	93° 12' 40.062" W	37° 10' 9.067" N	481256	4113661	SE-34-29-21
116	PEARSON CREEK	93° 12' 25.584" W	37° 10' 10.724" N	481613	4113712	SW-35-29-21
117	JAMES RIVER	93° 12' 55.406" W	37° 8' 56.438" N	480872	4111424	NE-10-28-21
118	PEARSON CREEK	93° 12' 25.955" W	37° 10' 14.761" N	481604	4113836	SW-35-29-21
119	PEARSON CREEK	93° 12' 21.001" W	37° 10' 20.717" N	481727	4114019	NW-35-29-21
120	PEARSON CREEK	93° 12' 14.743" W	37° 10' 22.737" N	481881	4114081	NW-35-29-21
121	PEARSON CREEK	93° 12' 9.047" W	37° 10' 24.840" N	482022	4114146	NW-35-29-21
122	PEARSON CREEK	93° 11' 57.749" W	37° 10' 21.151" N	482300	4114031	NW-35-29-21
123	PEARSON CREEK	93° 11' 31.898" W	37° 10' 18.886" N	482937	4113960	NE-35-29-21
124	PEARSON CREEK	93° 11' 39.654" W	37° 10' 36.142" N	482747	4114492	NE-35-29-21
125	PEARSON CREEK	93° 11' 44.140" W	37° 10' 35.776" N	482637	4114481	NE-35-29-21
126	JAMES RIVER	93° 13' 8.535" W	37° 9' 25.390" N	480551	4112317	SW-03-28-21
127	SAC RIVER	93° 24' 16.158" W	37° 11' 54.694" N	464103	4116972	SW-24-29-23
128	WILSON CREEK	93° 24' 8.219" W	37° 12' 7.069" N	464301	4117353	SW-24-29-23
129	WILSON CREEK	93° 23' 45.378" W	37° 11' 57.861" N	464863	4117066	SW-24-29-23
130	WILSON CREEK	93° 23' 27.277" W	37° 12' 9.955" N	465310	4117437	SE-24-29-23
131	WILSON CREEK	93° 23' 27.410" W	37° 12' 3.378" N	465306	4117235	SE-24-29-23
132	CLEAR CREEK	93° 25' 41.883" W	37° 14' 37.567" N	462013	4122000	SE-03-29-23
133	CLEAR CREEK	93° 25' 44.073" W	37° 14' 46.973" N	461960	4122291	SE-03-29-23
138*	SPRING BRANCH	93° 20' 25.424" W	37° 15' 19.394" N	469814	4123258	W 1/2 LOT 2-04-29-22
139	SPRING BRANCH	93° 20' 30.770" W	37° 15' 21.693" N	469683	4123329	W 1/2 LOT 2-04-29-22
140	SPRING BRANCH	93° 20' 30.760" W	37° 15' 21.627" N	469683	4123327	W 1/2 LOT 2-04-29-22
141	PEA RIDGE CREEK	93° 18' 26.259" W	37° 15' 52.783" N	472753	4124277	W 1/2 LOT 5-02-29-22
142	PEA RIDGE CREEK	93° 18' 26.421" W	37° 15' 52.789" N	472749	4124277	W 1/2 LOT 5-02-29-22
143	PEA RIDGE CREEK	93° 18' 17.540" W	37° 16' 4.025" N	472969	4124622	W 1/2 LOT 6-02-29-22
144	PEA RIDGE CREEK	93° 18' 11.005" W	37° 16' 5.176" N	473130	4124657	W 1/2 LOT 6-02-29-22
145	PEA RIDGE CREEK	93° 18' 11.835" W	37° 16' 5.487" N	473109	4124667	W 1/2 LOT 6-02-29-22
146	PEA RIDGE CREEK	93° 18' 16.213" W	37° 16' 6.884" N	473002	4124710	W 1/2 LOT 6-02-29-22
147	SOUTH DRY SAC	93° 18' 5.497" W	37° 16' 11.514" N	473266	4124852	W 1/2 LOT 6-02-29-22
148	PEA RIDGE CREEK	93° 17' 40.736" W	37° 15' 46.238" N	473873	4124071	E 1/2 LOT 5-02-29-22
149	SOUTH DRY SAC	93° 17' 0.496" W	37° 16' 29.659" N	474868	4125406	SE-31-30-21
150	SOUTH DRY SAC	93° 17' 0.863" W	37° 16' 31.105" N	474860	4125451	SE-31-30-21
151	SOUTH DRY SAC	93° 17' 0.298" W	37° 16' 31.130" N	474873	4125452	SE-31-30-21

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
152	SOUTH DRY SAC	93° 16' 18.142" W	37° 16' 3.490" N	475909	4124597	W 1/2 LOT 6-06-29-21
153	SOUTH DRY SAC	93° 16' 21.831" W	37° 16' 13.277" N	475819	4124899	W 1/2 LOT 7-06-29-21
154	SOUTH DRY SAC	93° 16' 15.333" W	37° 16' 9.306" N	475979	4124776	W 1/2 LOT 6-06-29-21
155	SOUTH DRY SAC	93° 16' 15.216" W	37° 16' 9.315" N	475982	4124776	W 1/2 LOT 6-06-29-21
156	SOUTH DRY SAC	93° 16' 3.214" W	37° 16' 13.915" N	476278	4124917	E 1/2 LOT 7-06-29-21
157	SOUTH DRY SAC	93° 16' 15.436" W	37° 16' 5.155" N	475976	4124648	W 1/2 LOT 6-06-29-21
158	SOUTH DRY SAC	93° 16' 15.631" W	37° 15' 58.467" N	475971	4124442	W 1/2 LOT 6-06-29-21
159	SOUTH DRY SAC	93° 15' 17.643" W	37° 15' 42.969" N	477397	4123960	W 1/2 LOT 5-05-29-21
160	SOUTH DRY SAC	93° 15' 10.879" W	37° 15' 48.453" N	477564	4124129	W 1/2 LOT 5-05-29-21
161	SOUTH DRY SAC	93° 15' 38.507" W	37° 15' 35.917" N	476883	4123744	E 1/2 LOT 4-06-29-21
162	SOUTH DRY SAC	93° 14' 12.874" W	37° 15' 31.940" N	478992	4123616	W 1/2 LOT 4-04-29-21
163	SOUTH DRY SAC	93° 14' 12.564" W	37° 15' 34.763" N	479000	4123703	W 1/2 LOT 4-04-29-21
164	SOUTH DRY SAC	93° 14' 13.367" W	37° 15' 29.222" N	478980	4123533	W 1/2 LOT 4-04-29-21
165	WILSON CREEK	93° 22' 26.367" W	37° 11' 11.044" N	466805	4115616	SE-30-29-22
166	HUNT BRANCH	93° 12' 47.275" W	37° 6' 38.095" N	481063	4107160	SE-22-28-21
167	HUNT BRANCH	93° 12' 58.536" W	37° 6' 29.500" N	480785	4106896	SE-22-28-21
168	JAMES RIVER	93° 13' 49.957" W	37° 6' 48.578" N	479517	4107487	SE-21-28-21
169	WILSON CREEK	93° 22' 41.750" W	37° 10' 5.119" N	466417	4113586	NW-06-28-22
170	WILSON CREEK	93° 22' 41.108" W	37° 10' 3.897" N	466433	4113548	NW-06-28-22
171	JAMES RIVER	93° 11' 43.150" W	37° 8' 53.345" N	482655	4111325	NE-11-28-21
172	JAMES RIVER	93° 11' 43.319" W	37° 8' 48.819" N	482650	4111185	NE-11-28-21
173	JAMES RIVER	93° 11' 54.820" W	37° 8' 55.622" N	482367	4111396	NE-11-28-21
174	SOUTH CREEK	93° 21' 9.913" W	37° 10' 26.554" N	468684	4114238	SE-32-29-22
175	SOUTH CREEK	93° 21' 5.623" W	37° 10' 20.692" N	468790	4114056	SE-32-29-22
176	SOUTH CREEK	93° 20' 51.150" W	37° 10' 16.591" N	469146	4113929	SW-33-29-22
177	SOUTH CREEK	93° 20' 51.879" W	37° 10' 15.801" N	469128	4113905	SW-33-29-22
178	SOUTH CREEK	93° 20' 54.006" W	37° 10' 14.556" N	469075	4113866	SW-33-29-22
179	WILSON CREEK	93° 22' 56.047" W	37° 9' 42.854" N	466062	4112901	NW-06-28-22
180	WILSON CREEK	93° 22' 54.618" W	37° 9' 41.810" N	466097	4112869	NW-06-28-22
181	WILSON CREEK	93° 21' 52.182" W	37° 11' 18.284" N	467648	4115836	SW-29-29-22
182	WILSON CREEK	93° 21' 40.399" W	37° 11' 18.452" N	467939	4115840	SW-29-29-22
183	WILSON CREEK	93° 21' 34.287" W	37° 11' 17.068" N	468089	4115796	SW-29-29-22
184	WILSON CREEK	93° 21' 41.444" W	37° 11' 7.411" N	467912	4115500	SW-29-29-22
185	WILSON CREEK	93° 21' 53.737" W	37° 11' 14.045" N	467609	4115705	SW-29-29-22
186	WILSON CREEK	93° 21' 56.335" W	37° 11' 11.729" N	467545	4115634	SW-29-29-22
187	WILSON CREEK	93° 21' 59.241" W	37° 11' 6.373" N	467473	4115469	SW-29-29-22
188	WILSON CREEK	93° 21' 59.800" W	37° 10' 59.869" N	467458	4115269	SW-29-29-22
189	WILSON CREEK	93° 21' 57.909" W	37° 10' 59.633" N	467505	4115261	SW-29-29-22
190	SOUTH CREEK	93° 20' 57.755" W	37° 10' 11.658" N	468983	4113777	SW-33-29-22
191	SOUTH CREEK	93° 21' 0.639" W	37° 10' 8.068" N	468911	4113667	SW-33-29-22
192	SOUTH CREEK	93° 21' 0.575" W	37° 10' 21.592" N	468914	4114084	SW-33-29-22
193	SOUTH CREEK	93° 20' 59.663" W	37° 10' 22.882" N	468937	4114123	SW-33-29-22
194	SOUTH CREEK	93° 21' 0.021" W	37° 10' 26.623" N	468928	4114239	SW-33-29-22
195	SOUTH CREEK	93° 20' 59.931" W	37° 10' 30.347" N	468931	4114354	SW-33-29-22
196	SOUTH CREEK	93° 20' 59.419" W	37° 10' 3.054" N	468941	4113512	NW-04-28-22
197	SOUTH CREEK	93° 20' 45.526" W	37° 10' 5.788" N	469284	4113595	NW-04-28-22
198	SOUTH CREEK	93° 20' 48.196" W	37° 10' 0.680" N	469217	4113438	NW-04-28-22
200*	SOUTH CREEK	93° 21' 2.101" W	37° 10' 7.212" N	468875	4113641	SE-32-29-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
201	SOUTH CREEK	93° 21' 1.987" W	37° 10' 10.921" N	468878	4113755	SE-32-29-22
202	SOUTH CREEK	93° 21' 4.113" W	37° 10' 13.517" N	468826	4113835	SE-32-29-22
203	SOUTH CREEK	93° 21' 25.592" W	37° 9' 59.753" N	468295	4113413	NE-05-28-22
204	SOUTH CREEK	93° 21' 18.036" W	37° 9' 57.751" N	468481	4113351	NE-05-28-22
205	SOUTH CREEK	93° 21' 20.691" W	37° 9' 49.665" N	468414	4113102	NE-05-28-22
206	SOUTH CREEK	93° 21' 29.131" W	37° 9' 45.910" N	468206	4112987	NE-05-28-22
207	SOUTH CREEK	93° 21' 33.803" W	37° 9' 49.122" N	468091	4113086	NE-05-28-22
208	SOUTH CREEK	93° 21' 29.603" W	37° 9' 43.645" N	468194	4112917	NE-05-28-22
209	SOUTH CREEK	93° 21' 30.317" W	37° 9' 39.617" N	468176	4112793	NE-05-28-22
210	SOUTH CREEK	93° 21' 37.970" W	37° 9' 39.692" N	467987	4112796	NW-05-28-22
211	WILSON CREEK	93° 21' 48.621" W	37° 9' 51.191" N	467726	4113151	NW-05-28-22
212	WILSON CREEK	93° 21' 48.699" W	37° 9' 55.011" N	467724	4113269	NW-05-28-22
213	WILSON CREEK	93° 21' 47.947" W	37° 9' 55.803" N	467743	4113293	NW-05-28-22
214	SOUTH CREEK	93° 21' 35.391" W	37° 10' 3.239" N	468054	4113521	NW-05-28-22
215	SOUTH CREEK	93° 21' 35.370" W	37° 10' 4.108" N	468054	4113548	NW-05-28-22
216	INMAN CREEK	93° 20' 55.425" W	37° 9' 29.904" N	469035	4112490	SW-04-28-22
217	INMAN CREEK	93° 20' 56.995" W	37° 9' 25.416" N	468996	4112352	SW-04-28-22
218	INMAN CREEK	93° 20' 52.314" W	37° 9' 34.421" N	469113	4112629	SW-04-28-22
219	INMAN CREEK	93° 21' 10.678" W	37° 9' 30.641" N	468659	4112515	SE-05-28-22
220	INMAN CREEK	93° 21' 9.677" W	37° 9' 30.673" N	468684	4112515	SE-05-28-22
221	SOUTH CREEK	93° 21' 28.938" W	37° 9' 34.585" N	468209	4112638	SE-05-28-22
222	SOUTH CREEK	93° 21' 29.530" W	37° 9' 33.604" N	468195	4112608	SE-05-28-22
223	SOUTH CREEK	93° 21' 32.812" W	37° 9' 26.649" N	468113	4112394	SE-05-28-22
224	INMAN CREEK	93° 21' 18.871" W	37° 9' 27.986" N	468457	4112434	SE-05-28-22
225	SOUTH CREEK	93° 21' 35.875" W	37° 9' 11.794" N	468036	4111936	NW-08-28-22
226	SOUTH CREEK	93° 21' 31.652" W	37° 9' 13.148" N	468140	4111977	SE-05-28-22
227	SOUTH CREEK	93° 21' 28.973" W	37° 9' 8.332" N	468205	4111829	NE-08-28-22
228	WILSON CREEK	93° 21' 33.826" W	37° 9' 0.154" N	468085	4111577	NE-08-28-22
229	INMAN CREEK	93° 21' 17.070" W	37° 9' 21.854" N	468501	4112244	SE-05-28-22
230	INMAN CREEK	93° 21' 9.504" W	37° 9' 18.605" N	468687	4112144	SE-05-28-22
231	INMAN CREEK	93° 21' 3.691" W	37° 9' 16.896" N	468830	4112090	SE-05-28-22
232	WILSON CREEK	93° 21' 9.819" W	37° 8' 45.195" N	468675	4111114	SE-08-28-22
233	WILSON CREEK	93° 21' 5.773" W	37° 8' 45.156" N	468775	4111112	SE-08-28-22
234	WILSON CREEK	93° 21' 4.468" W	37° 8' 39.204" N	468807	4110929	SE-08-28-22
235	SOUTH CREEK	93° 20' 36.154" W	37° 9' 55.323" N	469513	4113272	NW-04-28-22
236	SOUTH CREEK	93° 20' 35.661" W	37° 9' 54.443" N	469526	4113245	NW-04-28-22
238	INMAN CREEK	93° 20' 34.832" W	37° 9' 19.621" N	469542	4112172	SW-04-28-22
239	INMAN CREEK	93° 20' 40.697" W	37° 9' 19.743" N	469397	4112176	SW-04-28-22
240	INMAN CREEK	93° 20' 49.346" W	37° 9' 22.338" N	469184	4112257	SW-04-28-22
241	INMAN CREEK	93° 20' 41.808" W	37° 9' 25.849" N	469371	4112364	SW-04-28-22
242	INMAN CREEK	93° 20' 48.343" W	37° 9' 25.359" N	469210	4112350	SW-04-28-22
243	INMAN CREEK	93° 20' 47.502" W	37° 9' 25.395" N	469230	4112351	SW-04-28-22
244	WILSON CREEK	93° 21' 22.940" W	37° 8' 23.330" N	468349	4110441	SE-08-28-22
245	WILSON CREEK	93° 21' 19.864" W	37° 8' 34.484" N	468426	4110785	SE-08-28-22
246	WILSON CREEK	93° 21' 35.469" W	37° 8' 34.918" N	468041	4110800	SE-08-28-22
248*	WILSON CREEK	93° 21' 46.252" W	37° 8' 27.611" N	467774	4110576	SW-08-28-22
249	WILSON CREEK	93° 21' 40.267" W	37° 8' 28.523" N	467922	4110603	SW-08-28-22
250	WILSON CREEK	93° 21' 28.569" W	37° 8' 13.454" N	468209	4110138	NE-17-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
251	WILSON CREEK	93° 21' 25.858" W	37° 8' 5.802" N	468275	4109902	NE-17-28-22
252	WILSON CREEK	93° 21' 26.631" W	37° 8' 2.870" N	468256	4109811	NE-17-28-22
253	WILSON CREEK	93° 21' 27.371" W	37° 8' 1.398" N	468237	4109766	NE-17-28-22
254	WILSON CREEK	93° 21' 25.228" W	37° 8' 10.769" N	468291	4110055	NE-17-28-22
255	WILSON CREEK	93° 21' 25.207" W	37° 8' 7.290" N	468291	4109947	NE-17-28-22
256	WILSON CREEK	93° 21' 19.919" W	37° 7' 58.384" N	468421	4109672	NE-17-28-22
257	WILSON CREEK	93° 21' 18.112" W	37° 7' 59.030" N	468465	4109692	NE-17-28-22
258	WILSON CREEK	93° 21' 14.725" W	37° 8' 0.492" N	468549	4109737	NE-17-28-22
259	WILSON CREEK	93° 21' 9.413" W	37° 7' 58.867" N	468680	4109686	NE-17-28-22
260	WILSON CREEK	93° 21' 9.500" W	37° 7' 56.067" N	468677	4109600	NE-17-28-22
261	WILSON CREEK	93° 21' 28.861" W	37° 7' 34.573" N	468197	4108940	SE-17-28-22
262	WILSON CREEK	93° 21' 28.806" W	37° 7' 35.168" N	468199	4108958	SE-17-28-22
263	WILSON CREEK	93° 21' 14.464" W	37° 7' 55.584" N	468555	4109586	NE-17-28-22
264	WILSON CREEK	93° 21' 9.334" W	37° 8' 6.959" N	468683	4109936	NE-17-28-22
265	WILSON CREEK	93° 21' 4.721" W	37° 7' 52.962" N	468795	4109504	NW-16-28-22
266	WILSON CREEK	93° 21' 9.256" W	37° 8' 6.964" N	468685	4109936	NE-17-28-22
267	WARD BRANCH	93° 18' 27.436" W	37° 6' 42.435" N	472669	4107317	SW-23-28-22
268	WARD BRANCH	93° 18' 28.017" W	37° 6' 42.417" N	472654	4107317	SW-23-28-22
269	WARD BRANCH	93° 18' 27.297" W	37° 6' 36.682" N	472672	4107140	SW-23-28-22
270	WARD BRANCH	93° 18' 43.649" W	37° 6' 54.543" N	472270	4107692	SW-23-28-22
271	WARD BRANCH	93° 18' 44.281" W	37° 6' 54.363" N	472254	4107686	SW-23-28-22
272	WARD BRANCH	93° 18' 42.933" W	37° 6' 54.198" N	472287	4107681	SW-23-28-22
273	WARD BRANCH	93° 18' 45.297" W	37° 6' 51.018" N	472229	4107583	SW-23-28-22
274	WARD BRANCH	93° 18' 35.372" W	37° 6' 49.431" N	472474	4107533	SW-23-28-22
275	WARD BRANCH	93° 18' 35.110" W	37° 6' 48.209" N	472480	4107496	SW-23-28-22
276	WARD BRANCH	93° 18' 35.925" W	37° 6' 49.194" N	472460	4107526	SW-23-28-22
277	WARD BRANCH	93° 18' 25.735" W	37° 6' 49.612" N	472711	4107538	SW-23-28-22
278	WARD BRANCH	93° 20' 23.569" W	37° 7' 12.683" N	469806	4108259	NE-21-28-22
279	INMAN CREEK	93° 21' 13.776" W	37° 9' 30.495" N	468583	4112510	SE-05-28-22
280	INMAN CREEK	93° 21' 16.784" W	37° 9' 24.949" N	468508	4112340	SE-05-28-22
281	INMAN CREEK	93° 20' 58.419" W	37° 9' 7.528" N	468959	4111801	NW-09-28-22
282	INMAN CREEK	93° 20' 56.508" W	37° 9' 10.608" N	469006	4111896	NW-09-28-22
283	INMAN CREEK	93° 21' 1.130" W	37° 9' 17.319" N	468893	4112103	SW-04-28-22
284	INMAN CREEK	93° 20' 57.591" W	37° 9' 17.005" N	468980	4112093	SW-04-28-22
285	INMAN CREEK	93° 20' 59.276" W	37° 9' 20.172" N	468939	4112191	SW-04-28-22
286	INMAN CREEK	93° 20' 54.700" W	37° 9' 21.472" N	469052	4112231	SW-04-28-22
287	INMAN CREEK	93° 20' 48.006" W	37° 9' 19.423" N	469217	4112167	SW-04-28-22
288	INMAN CREEK	93° 20' 47.545" W	37° 9' 10.930" N	469228	4111905	NW-09-28-22
289	INMAN CREEK	93° 20' 35.501" W	37° 9' 14.161" N	469525	4112004	SW-04-28-22
290	INMAN CREEK	93° 20' 29.754" W	37° 9' 16.859" N	469667	4112086	SW-04-28-22
291	INMAN CREEK	93° 20' 46.299" W	37° 9' 0.749" N	469257	4111591	NW-09-28-22
292	INMAN CREEK	93° 20' 49.210" W	37° 8' 57.832" N	469185	4111502	NW-09-28-22
293	INMAN CREEK	93° 20' 45.737" W	37° 8' 58.000" N	469271	4111506	NW-09-28-22
294	INMAN CREEK	93° 20' 59.456" W	37° 8' 58.044" N	468932	4111509	NW-09-28-22
295	INMAN CREEK	93° 20' 59.968" W	37° 8' 58.023" N	468920	4111508	NW-09-28-22
296	WILSON CREEK	93° 21' 2.501" W	37° 8' 49.340" N	468856	4111241	NW-09-28-22
297	WILSON CREEK	93° 20' 53.501" W	37° 8' 39.246" N	469077	4110929	SW-09-28-22
298	INMAN CREEK	93° 19' 49.460" W	37° 9' 22.413" N	470662	4112254	SW-03-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
299	INMAN CREEK	93° 19' 47.651" W	37° 9' 18.337" N	470706	4112128	SW-03-28-22
300	INMAN CREEK	93° 19' 42.404" W	37° 9' 16.075" N	470835	4112058	SW-03-28-22
301	INMAN CREEK	93° 20' 11.615" W	37° 8' 55.996" N	470112	4111442	NE-09-28-22
302	INMAN CREEK	93° 20' 10.870" W	37° 8' 56.966" N	470131	4111472	NE-09-28-22
303	INMAN CREEK	93° 20' 8.379" W	37° 9' 0.802" N	470193	4111590	NE-09-28-22
304	SOUTH CREEK	93° 21' 4.740" W	37° 10' 14.643" N	468811	4113870	SE-32-29-22
305	SOUTH CREEK	93° 21' 5.806" W	37° 10' 15.808" N	468785	4113906	SE-32-29-22
306	SOUTH CREEK	93° 21' 5.819" W	37° 10' 17.430" N	468784	4113956	SE-32-29-22
307	SOUTH CREEK	93° 21' 21.454" W	37° 10' 7.450" N	468398	4113650	SE-32-29-22
308	SOUTH CREEK	93° 21' 34.490" W	37° 10' 8.218" N	468076	4113675	SW-32-29-22
309	SOUTH CREEK	93° 21' 35.525" W	37° 10' 8.064" N	468051	4113670	SW-32-29-22
310	SOUTH CREEK	93° 21' 2.636" W	37° 10' 0.972" N	468861	4113449	NE-05-28-22
311	SOUTH CREEK	93° 21' 5.035" W	37° 9' 59.554" N	468802	4113405	NE-05-28-22
312	SOUTH CREEK	93° 21' 6.526" W	37° 9' 57.152" N	468765	4113331	NE-05-28-22
313	SOUTH CREEK	93° 21' 10.871" W	37° 9' 51.289" N	468657	4113151	NE-05-28-22
314	SOUTH CREEK	93° 21' 16.625" W	37° 9' 56.115" N	468515	4113300	NE-05-28-22
315	SOUTH CREEK	93° 21' 19.407" W	37° 9' 59.274" N	468447	4113398	NE-05-28-22
316	SOUTH CREEK	93° 21' 28.991" W	37° 10' 2.901" N	468211	4113510	NE-05-28-22
317	SOUTH CREEK	93° 21' 28.371" W	37° 10' 2.067" N	468226	4113485	NE-05-28-22
318	INMAN CREEK	93° 20' 58.659" W	37° 9' 1.303" N	468952	4111609	NW-09-28-22
320	INMAN CREEK	93° 19' 58.049" W	37° 8' 38.806" N	470445	4110911	SE-09-28-22
321	WILSON CREEK	93° 20' 43.638" W	37° 8' 26.260" N	469319	4110528	SW-09-28-22
322	WILSON CREEK	93° 20' 45.622" W	37° 8' 22.045" N	469270	4110398	SW-09-28-22
323	WILSON CREEK	93° 20' 44.183" W	37° 8' 22.197" N	469305	4110403	SW-09-28-22
324	JAMES RIVER	93° 12' 53.161" W	37° 9' 22.515" N	480930	4112227	SE-03-28-21
325	JAMES RIVER	93° 12' 49.739" W	37° 9' 18.342" N	481014	4112099	SE-03-28-21
326	JAMES RIVER	93° 13' 12.415" W	37° 9' 16.962" N	480454	4112057	SW-03-28-21
327	JAMES RIVER	93° 12' 59.889" W	37° 9' 8.386" N	480763	4111792	SE-03-28-21
328	JAMES RIVER	93° 12' 57.566" W	37° 9' 9.684" N	480820	4111832	SE-03-28-21
329	JAMES RIVER	93° 12' 59.929" W	37° 8' 55.738" N	480761	4111403	NE-10-28-21
330	JAMES RIVER	93° 13' 0.473" W	37° 9' 1.600" N	480748	4111583	SE-03-28-21
331	JAMES RIVER	93° 13' 0.378" W	37° 9' 4.541" N	480750	4111674	SE-03-28-21
332	JAMES RIVER	93° 13' 9.588" W	37° 8' 55.437" N	480522	4111394	NW-10-28-21
333	HUNT BRANCH	93° 12' 46.400" W	37° 7' 4.303" N	481087	4107968	NE-22-28-21
334	HUNT BRANCH	93° 12' 53.849" W	37° 6' 50.073" N	480902	4107530	SE-22-28-21
335	HUNT BRANCH	93° 13' 11.599" W	37° 6' 59.977" N	480465	4107836	NW-22-28-21
336	JAMES RIVER	93° 13' 31.215" W	37° 7' 9.594" N	479981	4108134	NW-22-28-21
337	JAMES RIVER	93° 13' 32.024" W	37° 7' 9.327" N	479961	4108125	NW-22-28-21
338	HUNT BRANCH	93° 13' 5.489" W	37° 6' 43.324" N	480614	4107323	SW-22-28-21
339	HUNT BRANCH	93° 13' 15.578" W	37° 6' 32.737" N	480364	4106997	SW-22-28-21
340	HUNT BRANCH	93° 13' 18.037" W	37° 6' 27.681" N	480303	4106841	SW-22-28-21
341	HUNT BRANCH	93° 13' 17.247" W	37° 6' 27.754" N	480323	4106843	SW-22-28-21
342	HUNT BRANCH	93° 13' 11.948" W	37° 6' 26.233" N	480454	4106796	SW-22-28-21
343	HUNT BRANCH	93° 13' 5.025" W	37° 6' 27.269" N	480625	4106828	SE-22-28-21
344	HUNT BRANCH	93° 13' 5.782" W	37° 6' 40.982" N	480607	4107250	SW-22-28-21
345	HUNT BRANCH	93° 12' 52.948" W	37° 6' 38.249" N	480923	4107166	SE-22-28-21
346	WARD BRANCH	93° 20' 18.542" W	37° 7' 8.111" N	469929	4108118	NE-21-28-22
347	WARD BRANCH	93° 20' 17.754" W	37° 7' 5.036" N	469949	4108023	NE-21-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
348	JAMES RIVER	93° 20' 30.434" W	37° 6' 51.921" N	469634	4107620	SE-21-28-22
349	JAMES RIVER	93° 20' 31.216" W	37° 6' 45.455" N	469614	4107421	SE-21-28-22
350	JAMES RIVER	93° 20' 29.936" W	37° 6' 44.225" N	469646	4107383	SE-21-28-22
351	JAMES RIVER	93° 20' 21.292" W	37° 6' 52.376" N	469860	4107633	SE-21-28-22
352	JAMES RIVER	93° 20' 19.907" W	37° 6' 51.942" N	469894	4107620	SE-21-28-22
353	WARD BRANCH	93° 18' 18.119" W	37° 7' 6.578" N	472901	4108060	NE-23-28-22
354	WARD BRANCH	93° 18' 32.297" W	37° 7' 3.147" N	472551	4107956	NW-23-28-22
355	WARD BRANCH	93° 18' 21.373" W	37° 7' 17.063" N	472822	4108384	NE-23-28-22
356	WARD BRANCH	93° 18' 20.826" W	37° 7' 12.106" N	472835	4108231	NE-23-28-22
357	WARD BRANCH	93° 18' 19.346" W	37° 7' 8.774" N	472871	4108128	NE-23-28-22
358	WARD BRANCH	93° 18' 36.564" W	37° 7' 7.165" N	472446	4108080	NW-23-28-22
359	WARD BRANCH	93° 18' 40.417" W	37° 7' 9.241" N	472351	4108144	NW-23-28-22
360	WARD BRANCH	93° 18' 51.239" W	37° 7' 4.944" N	472084	4108013	NW-23-28-22
361	WARD BRANCH	93° 19' 11.324" W	37° 6' 56.004" N	471587	4107739	SE-22-28-22
362	WARD BRANCH	93° 19' 23.599" W	37° 6' 52.219" N	471284	4107623	SE-22-28-22
363	WARD BRANCH	93° 19' 1.070" W	37° 6' 48.308" N	471839	4107501	SE-22-28-22
364	WARD BRANCH	93° 18' 59.388" W	37° 6' 50.579" N	471881	4107571	SE-22-28-22
365	JAMES RIVER	93° 18' 55.465" W	37° 6' 26.020" N	471975	4106814	NW-26-28-22
366	JAMES RIVER	93° 18' 46.979" W	37° 6' 28.020" N	472185	4106875	NW-26-28-22
367	JAMES RIVER	93° 18' 49.282" W	37° 6' 21.965" N	472127	4106688	NW-26-28-22
368	JAMES RIVER	93° 18' 55.353" W	37° 6' 23.088" N	471978	4106723	NW-26-28-22
369	WARD BRANCH	93° 18' 45.247" W	37° 6' 45.009" N	472229	4107398	SW-23-28-22
370	WARD BRANCH	93° 19' 12.428" W	37° 7' 15.606" N	471562	4108343	NE-22-28-22
371	WARD BRANCH	93° 19' 12.179" W	37° 7' 22.053" N	471569	4108542	NE-22-28-22
372	WARD BRANCH	93° 18' 54.256" W	37° 7' 7.972" N	472009	4108106	NW-23-28-22
373	WARD BRANCH	93° 18' 45.775" W	37° 7' 14.340" N	472219	4108302	NW-23-28-22
374	WARD BRANCH	93° 18' 46.982" W	37° 7' 20.129" N	472190	4108480	NW-23-28-22
375	WARD BRANCH	93° 18' 46.521" W	37° 7' 20.586" N	472202	4108494	NW-23-28-22
376	WARD BRANCH	93° 18' 44.279" W	37° 7' 14.500" N	472256	4108307	NW-23-28-22
377	WARD BRANCH	93° 18' 37.397" W	37° 7' 15.870" N	472426	4108348	NW-23-28-22
378	WARD BRANCH	93° 18' 28.915" W	37° 7' 16.813" N	472636	4108377	NW-23-28-22
379	WARD BRANCH	93° 18' 24.227" W	37° 7' 23.034" N	472752	4108568	NW-23-28-22
380	WARD BRANCH	93° 18' 47.400" W	37° 7' 27.731" N	472181	4108715	SW-14-28-22
381	WARD BRANCH	93° 18' 38.883" W	37° 7' 28.538" N	472391	4108739	SW-14-28-22
382	WARD BRANCH	93° 18' 14.069" W	37° 7' 30.641" N	473003	4108802	SE-14-28-22
383	WARD BRANCH	93° 18' 4.758" W	37° 7' 37.259" N	473234	4109005	SE-14-28-22
384	WARD BRANCH	93° 18' 9.176" W	37° 7' 26.926" N	473124	4108687	SE-14-28-22
385	WARD BRANCH	93° 19' 42.281" W	37° 7' 11.915" N	470825	4108232	NW-22-28-22
386	WARD BRANCH	93° 19' 43.423" W	37° 7' 13.691" N	470797	4108287	NW-22-28-22
387	WARD BRANCH	93° 19' 43.144" W	37° 7' 18.325" N	470804	4108429	NW-22-28-22
388	WARD BRANCH	93° 19' 43.173" W	37° 7' 18.835" N	470803	4108445	NW-22-28-22
389	WARD BRANCH	93° 19' 49.593" W	37° 7' 19.611" N	470645	4108470	NW-22-28-22
390	WARD BRANCH	93° 19' 50.225" W	37° 7' 15.519" N	470629	4108344	NW-22-28-22
391	JAMES RIVER	93° 20' 45.323" W	37° 6' 8.152" N	469262	4106272	NW-28-28-22
392	JAMES RIVER	93° 20' 46.822" W	37° 6' 5.839" N	469225	4106201	SW-28-28-22
393	JAMES RIVER	93° 20' 49.848" W	37° 6' 4.843" N	469150	4106171	SW-28-28-22
394	JAMES RIVER	93° 20' 42.816" W	37° 5' 59.561" N	469323	4106008	SW-28-28-22
395	JAMES RIVER	93° 20' 44.213" W	37° 5' 56.009" N	469288	4105898	SW-28-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
396	JAMES RIVER	93° 20' 48.109" W	37° 5' 53.272" N	469191	4105814	SW-28-28-22
397	JAMES RIVER	93° 20' 49.793" W	37° 5' 52.221" N	469150	4105782	SW-28-28-22
398	JAMES RIVER	93° 20' 53.556" W	37° 5' 52.165" N	469057	4105781	SW-28-28-22
399	JAMES RIVER	93° 20' 47.484" W	37° 5' 47.679" N	469206	4105642	SW-28-28-22
400	JAMES RIVER	93° 20' 48.323" W	37° 5' 50.627" N	469186	4105733	SW-28-28-22
401	JAMES RIVER	93° 20' 44.605" W	37° 5' 54.324" N	469278	4105846	SW-28-28-22
402	JAMES RIVER	93° 20' 32.233" W	37° 6' 11.793" N	469585	4106383	NE-28-28-22
403	WARD BRANCH	93° 19' 3.831" W	37° 6' 45.477" N	471771	4107414	SE-22-28-22
404	JAMES RIVER	93° 20' 31.153" W	37° 6' 17.869" N	469613	4106571	NE-28-28-22
405	JAMES RIVER	93° 20' 31.645" W	37° 6' 19.804" N	469601	4106630	NE-28-28-22
406	JAMES RIVER	93° 20' 24.279" W	37° 6' 24.099" N	469783	4106762	NE-28-28-22
407	JAMES RIVER	93° 20' 25.779" W	37° 6' 18.337" N	469745	4106585	NE-28-28-22
408	JAMES RIVER	93° 20' 49.086" W	37° 6' 23.207" N	469171	4106737	NW-28-28-22
409	JAMES RIVER	93° 20' 57.050" W	37° 6' 25.831" N	468974	4106818	NW-28-28-22
410	JAMES RIVER	93° 20' 57.031" W	37° 6' 29.596" N	468975	4106934	NW-28-28-22
411	JAMES RIVER	93° 20' 58.869" W	37° 6' 31.807" N	468930	4107003	NW-28-28-22
412	JAMES RIVER	93° 20' 57.521" W	37° 6' 23.453" N	468963	4106745	NW-28-28-22
413	JAMES RIVER	93° 20' 50.427" W	37° 6' 19.238" N	469137	4106615	NW-28-28-22
414	JAMES RIVER	93° 20' 49.756" W	37° 6' 9.251" N	469153	4106307	NW-28-28-22
415	JAMES RIVER	93° 20' 46.593" W	37° 6' 18.189" N	469232	4106582	NW-28-28-22
416	JAMES RIVER	93° 20' 40.347" W	37° 6' 17.469" N	469386	4106559	NW-28-28-22
417	JAMES RIVER	93° 20' 39.566" W	37° 6' 14.446" N	469405	4106466	NW-28-28-22
418	JAMES RIVER	93° 20' 43.563" W	37° 6' 11.425" N	469306	4106373	NW-28-28-22
419	SPRING BRANCH	93° 20' 27.748" W	37° 15' 27.776" N	469758	4123516	W 1/2 LOT 3-04-29-22
420	SPRING BRANCH	93° 20' 24.013" W	37° 15' 27.740" N	469850	4123515	W 1/2 LOT 3-04-29-22
421	SPRING BRANCH	93° 20' 23.916" W	37° 15' 27.745" N	469852	4123515	W 1/2 LOT 3-04-29-22
422	WILSON CREEK	93° 22' 4.506" W	37° 11' 39.548" N	467347	4116492	NE-30-29-22
423	PEARSON CREEK	93° 11' 0.317" W	37° 12' 17.727" N	483723	4117621	NW-24-29-21
424	PEARSON CREEK	93° 10' 58.834" W	37° 12' 16.468" N	483760	4117582	NW-24-29-21
425	PEARSON CREEK	93° 12' 10.649" W	37° 11' 39.050" N	481987	4116433	NW-26-29-21
426	PEARSON CREEK	93° 12' 19.908" W	37° 10' 24.929" N	481754	4114149	NW-35-29-21
427	HUNT BRANCH	93° 12' 37.145" W	37° 6' 32.160" N	481313	4106977	SE-22-28-21
428	HUNT BRANCH	93° 12' 35.259" W	37° 6' 42.334" N	481360	4107290	SE-22-28-21
429	SPRING BRANCH	93° 20' 18.301" W	37° 15' 27.109" N	469990	4123495	W 1/2 LOT 3-04-29-22
430	SPRING BRANCH	93° 20' 22.062" W	37° 15' 25.949" N	469898	4123459	W 1/2 LOT 3-04-29-22
431	SPRING BRANCH	93° 20' 13.015" W	37° 15' 27.041" N	470120	4123492	E 1/2 LOT 3-04-29-22
432	SPRING BRANCH	93° 20' 8.216" W	37° 15' 29.324" N	470239	4123562	E 1/2 LOT 3-04-29-22
433	SPRING BRANCH	93° 20' 6.147" W	37° 15' 31.129" N	470290	4123618	E 1/2 LOT 3-04-29-22
434	WARD BRANCH	93° 19' 50.272" W	37° 7' 7.826" N	470627	4108107	NW-22-28-22
435	SOUTH DRY SAC	93° 16' 37.874" W	37° 15' 58.694" N	475423	4124450	E 1/2 LOT 6-01-29-22
436	WILSON CREEK	93° 22' 18.505" W	37° 11' 41.682" N	467002	4116559	NE-30-29-22
437	WILSON CREEK	93° 21' 43.842" W	37° 7' 54.643" N	467830	4109559	NW-17-28-22
438	PEARSON CREEK	93° 12' 7.806" W	37° 10' 30.626" N	482053	4114324	NW-35-29-21
439	PEARSON CREEK	93° 12' 8.282" W	37° 10' 26.643" N	482041	4114201	NW-35-29-21
440	PEA RIDGE CREEK	93° 17' 36.910" W	37° 15' 49.558" N	473968	4124173	E 1/2 LOT 5-02-29-22
441	SOUTH DRY SAC	93° 17' 14.110" W	37° 16' 36.318" N	474534	4125613	SW-31-30-21
442	PEARSON CREEK	93° 11' 55.927" W	37° 13' 4.869" N	482356	4119076	NW-14-29-21
443	PEARSON CREEK	93° 11' 56.476" W	37° 12' 56.805" N	482342	4118828	SW-14-29-21

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
444	PEARSON CREEK	93° 12' 2.900" W	37° 12' 56.809" N	482183	4118828	SW-14-29-21
445	PEARSON CREEK	93° 12' 0.103" W	37° 13' 5.006" N	482253	4119081	NW-14-29-21
446	PEARSON CREEK	93° 12' 7.007" W	37° 13' 5.015" N	482083	4119081	NW-14-29-21
447	WILSON CREEK	93° 23' 29.859" W	37° 11' 41.728" N	465243	4116568	NE-25-29-23
448	WILSON CREEK	93° 23' 33.775" W	37° 11' 40.196" N	465146	4116521	NE-25-29-23
449	WILSON CREEK	93° 22' 32.927" W	37° 11' 20.323" N	466644	4115902	SE-30-29-22
450	WILSON CREEK	93° 22' 25.328" W	37° 11' 21.065" N	466831	4115924	SE-30-29-22
451	WILSON CREEK	93° 22' 21.145" W	37° 11' 21.561" N	466935	4115939	SE-30-29-22
452	WILSON CREEK	93° 22' 28.988" W	37° 11' 20.031" N	466741	4115893	SE-30-29-22
453	INMAN CREEK	93° 21' 20.638" W	37° 9' 17.879" N	468412	4112122	SE-05-28-22
454	WILSON CREEK	93° 21' 39.687" W	37° 8' 0.665" N	467933	4109745	NW-17-28-22
455	PEARSON CREEK	93° 12' 46.520" W	37° 13' 9.588" N	481109	4119225	NE-15-29-21
456	PEARSON CREEK	93° 12' 44.418" W	37° 13' 8.100" N	481161	4119179	NE-15-29-21
457	HUNT BRANCH	93° 13' 2.428" W	37° 7' 3.178" N	480691	4107934	NE-22-28-21
458	INMAN CREEK	93° 20' 9.812" W	37° 9' 19.318" N	470159	4112160	SE-04-28-22
459	INMAN CREEK	93° 20' 11.781" W	37° 9' 13.989" N	470110	4111996	SE-04-28-22
460	PEA RIDGE CREEK	93° 18' 56.682" W	37° 15' 59.159" N	472004	4124476	E 1/2 LOT 5-03-29-22
461	WARD BRANCH	93° 18' 14.196" W	37° 6' 56.393" N	472997	4107746	SE-23-28-22
462	WARD BRANCH	93° 18' 10.362" W	37° 6' 56.422" N	473091	4107747	SE-23-28-22
463	WARD BRANCH	93° 18' 18.060" W	37° 6' 39.938" N	472900	4107240	SE-23-28-22
464	WARD BRANCH	93° 18' 14.187" W	37° 6' 35.041" N	472995	4107088	SE-23-28-22
465	JAMES RIVER	93° 20' 12.552" W	37° 6' 17.469" N	470072	4106557	NE-28-28-22
466	JAMES RIVER	93° 20' 12.739" W	37° 6' 17.385" N	470067	4106554	NE-28-28-22
467	JAMES RIVER	93° 20' 15.113" W	37° 6' 13.870" N	470008	4106446	NE-28-28-22
468	JAMES RIVER	93° 20' 29.714" W	37° 6' 10.953" N	469647	4106357	NE-28-28-22
469	JAMES RIVER	93° 20' 19.414" W	37° 6' 13.111" N	469902	4106423	NE-28-28-22
470	JAMES RIVER	93° 20' 26.055" W	37° 6' 14.703" N	469738	4106473	NE-28-28-22
471	JAMES RIVER	93° 20' 31.238" W	37° 6' 8.765" N	469610	4106290	NE-28-28-22
472	JAMES RIVER	93° 20' 30.705" W	37° 6' 6.821" N	469623	4106230	SE-28-28-22
473	JAMES RIVER	93° 20' 32.901" W	37° 6' 4.658" N	469568	4106164	SE-28-28-22
474	JAMES RIVER	93° 20' 34.676" W	37° 6' 2.592" N	469524	4106100	SE-28-28-22
475	JAMES RIVER	93° 20' 36.428" W	37° 6' 1.244" N	469481	4106059	SW-28-28-22
476	JAMES RIVER	93° 20' 18.882" W	37° 6' 16.976" N	469915	4106542	NE-28-28-22
477	WARD BRANCH	93° 19' 41.874" W	37° 7' 52.010" N	470839	4109467	NW-15-28-22
478	WARD BRANCH	93° 20' 17.012" W	37° 7' 56.880" N	469973	4109620	NE-16-28-22
479	WARD BRANCH	93° 20' 19.773" W	37° 8' 1.715" N	469905	4109770	NE-16-28-22
480	WARD BRANCH	93° 20' 18.316" W	37° 8' 1.933" N	469941	4109776	NE-16-28-22
481	WARD BRANCH	93° 20' 20.327" W	37° 8' 6.205" N	469892	4109908	NE-16-28-22
482	WARD BRANCH	93° 20' 14.875" W	37° 8' 5.400" N	470026	4109883	NE-16-28-22
483	WARD BRANCH	93° 19' 38.955" W	37° 7' 54.693" N	470911	4109550	NW-15-28-22
484	WARD BRANCH	93° 19' 28.060" W	37° 7' 40.600" N	471179	4109115	SW-15-28-22
485	WARD BRANCH	93° 19' 42.380" W	37° 7' 40.168" N	470825	4109102	SW-15-28-22
486	WARD BRANCH	93° 19' 17.229" W	37° 7' 40.774" N	471446	4109119	SE-15-28-22
487	WARD BRANCH	93° 19' 37.326" W	37° 7' 25.044" N	470948	4108636	NW-22-28-22
488	WARD BRANCH	93° 19' 51.762" W	37° 7' 14.107" N	470591	4108300	NW-22-28-22
489	WARD BRANCH	93° 19' 51.720" W	37° 7' 22.211" N	470593	4108550	NW-22-28-22
490	WARD BRANCH	93° 19' 37.898" W	37° 8' 5.369" N	470939	4109879	NW-15-28-22
491	WARD BRANCH	93° 19' 40.394" W	37° 7' 55.020" N	470876	4109560	NW-15-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
492	WARD BRANCH	93° 19' 18.166" W	37° 7' 42.985" N	471423	4109187	SE-15-28-22
493	WARD BRANCH	93° 19' 18.433" W	37° 7' 41.001" N	471416	4109126	SE-15-28-22
494	WARD BRANCH	93° 19' 25.956" W	37° 7' 43.135" N	471231	4109193	SE-15-28-22
495	WARD BRANCH	93° 19' 19.302" W	37° 7' 46.314" N	471395	4109290	SE-15-28-22
496	WARD BRANCH	93° 19' 18.921" W	37° 7' 46.482" N	471405	4109295	SE-15-28-22
497	WARD BRANCH	93° 19' 11.128" W	37° 7' 45.402" N	471597	4109261	SE-15-28-22
498	WARD BRANCH	93° 19' 19.129" W	37° 7' 49.878" N	471400	4109400	SE-15-28-22
499	WARD BRANCH	93° 19' 16.591" W	37° 7' 52.000" N	471463	4109465	NE-15-28-22
500	WARD BRANCH	93° 19' 19.375" W	37° 7' 52.394" N	471394	4109477	NE-15-28-22
501	WARD BRANCH	93° 19' 14.875" W	37° 8' 1.580" N	471506	4109760	NE-15-28-22
502	WARD BRANCH	93° 19' 14.795" W	37° 8' 4.566" N	471508	4109852	NE-15-28-22
503	WARD BRANCH	93° 17' 26.841" W	37° 7' 48.248" N	474170	4109341	SW-13-28-22
504	WARD BRANCH	93° 17' 30.313" W	37° 7' 32.391" N	474083	4108852	SW-13-28-22
505	WARD BRANCH	93° 17' 30.137" W	37° 7' 36.782" N	474088	4108987	SW-13-28-22
506	WARD BRANCH	93° 17' 19.589" W	37° 7' 31.702" N	474348	4108830	SW-13-28-22
507	WARD BRANCH	93° 17' 23.799" W	37° 7' 41.739" N	474245	4109140	SW-13-28-22
508	WARD BRANCH	93° 17' 24.333" W	37° 7' 41.656" N	474232	4109137	SW-13-28-22
509	WARD BRANCH	93° 17' 29.727" W	37° 7' 44.801" N	474099	4109235	SW-13-28-22
510	WARD BRANCH	93° 17' 20.470" W	37° 7' 48.460" N	474328	4109347	SW-13-28-22
511	WARD BRANCH	93° 17' 20.175" W	37° 7' 48.686" N	474335	4109354	SW-13-28-22
512	WARD BRANCH	93° 17' 9.429" W	37° 7' 4.290" N	474596	4107985	NE-24-28-22
513	JAMES RIVER	93° 16' 48.394" W	37° 6' 55.473" N	475114	4107711	SE-24-28-22
514	JAMES RIVER	93° 16' 56.295" W	37° 6' 52.714" N	474919	4107627	SE-24-28-22
515	JAMES RIVER	93° 16' 42.607" W	37° 6' 24.513" N	475254	4106757	NW-30-28-21
516	JAMES RIVER	93° 16' 40.331" W	37° 6' 23.578" N	475310	4106728	NW-30-28-21
517	JAMES RIVER	93° 16' 39.174" W	37° 6' 22.403" N	475339	4106692	NW-30-28-21
518	JAMES RIVER	93° 16' 39.950" W	37° 6' 18.728" N	475319	4106578	NW-30-28-21
519	JAMES RIVER	93° 16' 28.245" W	37° 6' 20.329" N	475608	4106627	NW-30-28-21
520	JAMES RIVER	93° 16' 25.992" W	37° 6' 21.776" N	475664	4106671	NW-30-28-21
521	JAMES RIVER	93° 16' 31.351" W	37° 6' 17.471" N	475531	4106539	NW-30-28-21
522	JAMES RIVER	93° 16' 33.857" W	37° 6' 16.188" N	475469	4106500	NW-30-28-21
523	JAMES RIVER	93° 16' 37.614" W	37° 6' 14.113" N	475376	4106436	NW-30-28-21
524	JAMES RIVER	93° 16' 44.024" W	37° 6' 6.813" N	475218	4106212	NW-30-28-21
525	JAMES RIVER	93° 16' 40.351" W	37° 6' 10.678" N	475309	4106330	NW-30-28-21
526	JAMES RIVER	93° 16' 39.898" W	37° 6' 13.645" N	475320	4106422	NW-30-28-21
527	JAMES RIVER	93° 16' 42.937" W	37° 6' 37.383" N	475247	4107154	SW-19-28-21
528	HUNT BRANCH	93° 13' 38.024" W	37° 6' 48.095" N	479812	4107472	SE-21-28-21
529	JAMES RIVER	93° 20' 35.818" W	37° 6' 57.569" N	469502	4107794	SW-21-28-22
530	JAMES RIVER	93° 21' 0.296" W	37° 7' 1.435" N	468898	4107916	NW-21-28-22
531	INMAN CREEK	93° 21' 7.344" W	37° 9' 23.389" N	468741	4112291	SE-05-28-22
532	SPRING BRANCH	93° 20' 13.043" W	37° 15' 27.605" N	470120	4123510	E 1/2 LOT 3-04-29-22
533	SPRING BRANCH	93° 20' 5.992" W	37° 15' 31.663" N	470294	4123634	E 1/2 LOT 3-04-29-22
534	WILSON CREEK	93° 22' 41.535" W	37° 11' 11.247" N	466431	4115623	SW-30-29-22
535	SOUTH DRY SAC	93° 17' 46.846" W	37° 15' 57.527" N	473724	4124420	E 1/2 LOT 5-02-29-22
536	PEA RIDGE CREEK	93° 17' 38.519" W	37° 15' 47.468" N	473928	4124109	E 1/2 LOT 5-02-29-22
537	PEARSON CREEK	93° 12' 1.008" W	37° 13' 4.934" N	482230	4119079	NW-14-29-21
538	WILSON CREEK	93° 22' 30.886" W	37° 11' 20.284" N	466694	4115901	SE-30-29-22
539	JAMES RIVER	93° 16' 29.068" W	37° 6' 20.520" N	475588	4106633	NW-30-28-21

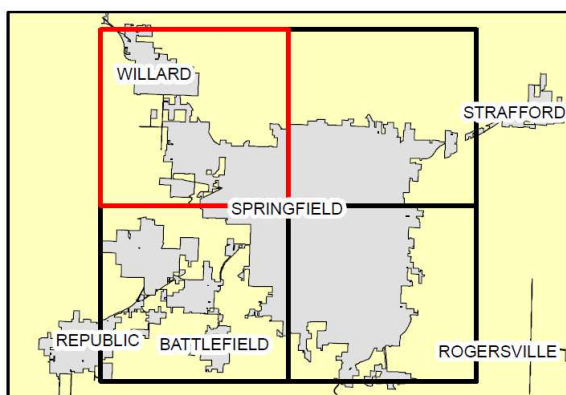
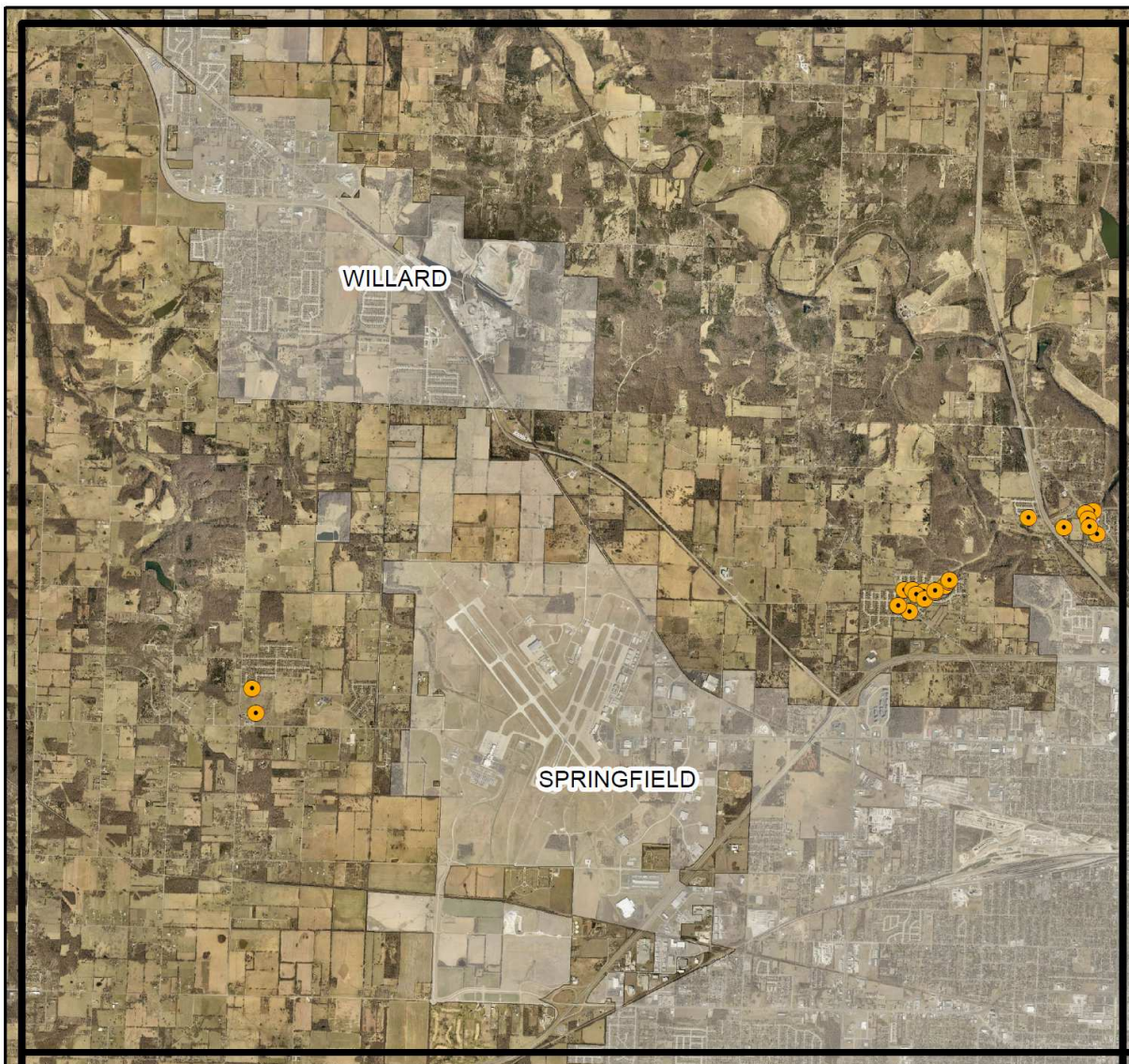
Outfall ID	Watershed	Longitude	Latitude	East	North	STR
540	PEARSON CREEK	93° 10' 59.134" W	37° 13' 50.465" N	483758	4120479	NW-12-29-21
541	JAMES RIVER	93° 20' 39.904" W	37° 6' 50.660" N	469400	4107582	SW-21-28-22
542	WILSON CREEK	93° 21' 8.441" W	37° 7' 51.326" N	468703	4109454	SE-17-28-22
543	PEARSON CREEK	93° 11' 42.889" W	37° 11' 38.195" N	482671	4116405	NE-26-29-21
544	WILSON CREEK	93° 22' 5.696" W	37° 10' 52.528" N	467312	4115043	NE-31-29-22
545	WILSON CREEK	93° 22' 4.340" W	37° 10' 46.008" N	467345	4114842	NW-32-29-22
546	WILSON CREEK	93° 23' 32.400" W	37° 11' 59.087" N	465183	4117103	SE-24-29-23
547	WILSON CREEK	93° 23' 32.381" W	37° 11' 58.148" N	465183	4117074	SE-24-29-23
548	WILSON CREEK	93° 23' 32.285" W	37° 11' 55.625" N	465185	4116996	SE-24-29-23
549	WILSON CREEK	93° 23' 27.935" W	37° 12' 10.055" N	465294	4117440	SE-24-29-23
550	PEA RIDGE CREEK	93° 18' 13.556" W	37° 16' 4.331" N	473067	4124631	W 1/2 LOT 6-02-29-22
551	SPRING BRANCH	93° 20' 18.004" W	37° 15' 24.106" N	469997	4123402	W 1/2 LOT 3-04-29-22
552	SOUTH DRY SAC	93° 16' 18.161" W	37° 16' 0.180" N	475908	4124495	W 1/2 LOT 6-06-29-21
553	SOUTH DRY SAC	93° 16' 18.300" W	37° 16' 0.318" N	475905	4124499	W 1/2 LOT 6-06-29-21
554	SOUTH DRY SAC	93° 16' 27.970" W	37° 16' 11.629" N	475668	4124848	E 1/2 LOT 7-01-29-22
555	PEARSON CREEK	93° 11' 40.628" W	37° 10' 45.352" N	482724	4114776	NE-35-29-21
556	JAMES RIVER	93° 16' 47.369" W	37° 6' 1.061" N	475135	4106035	SE-25-28-22
557	HUNT BRANCH	93° 13' 9.608" W	37° 6' 40.978" N	480512	4107251	SW-22-28-21
558	HUNT BRANCH	93° 13' 14.319" W	37° 6' 35.984" N	480396	4107097	SW-22-28-21
559	HUNT BRANCH	93° 12' 45.986" W	37° 6' 50.533" N	481096	4107544	NE-22-28-21
560	HUNT BRANCH	93° 12' 55.622" W	37° 6' 31.368" N	480857	4106954	SE-22-28-21
561	JAMES RIVER	93° 17' 58.403" W	37° 6' 33.446" N	473384	4107038	SE-23-28-22
562	WARD BRANCH	93° 18' 46.998" W	37° 7' 3.371" N	472188	4107964	NW-23-28-22
563	WARD BRANCH	93° 19' 7.397" W	37° 6' 59.990" N	471684	4107861	NE-22-28-22
564	JAMES RIVER	93° 20' 54.343" W	37° 5' 51.951" N	469037	4105774	SW-28-28-22
565	JAMES RIVER	93° 20' 53.695" W	37° 5' 51.189" N	469053	4105751	SW-28-28-22
566	JAMES RIVER	93° 20' 37.452" W	37° 6' 23.559" N	469458	4106747	NW-28-28-22
567	JAMES RIVER	93° 16' 47.084" W	37° 6' 58.104" N	475147	4107792	SE-24-28-22
568	WILSON CREEK	93° 21' 28.489" W	37° 7' 59.220" N	468209	4109699	NE-17-28-22
569	WILSON CREEK	93° 21' 27.641" W	37° 7' 58.430" N	468230	4109675	NE-17-28-22
570	JAMES RIVER	93° 16' 44.713" W	37° 6' 55.925" N	475205	4107725	SE-24-28-22
571	JAMES RIVER	93° 16' 43.440" W	37° 6' 53.360" N	475236	4107646	SW-19-28-21
572	JAMES RIVER	93° 16' 43.590" W	37° 6' 27.548" N	475230	4106851	NW-30-28-21
573	JAMES RIVER	93° 16' 46.288" W	37° 6' 27.501" N	475164	4106849	NE-25-28-22
574	PEA RIDGE CREEK	93° 17' 51.173" W	37° 15' 34.894" N	473615	4123723	E 1/2 LOT 4-02-29-22
575	WILSON CREEK	93° 22' 36.709" W	37° 11' 30.029" N	466552	4116202	NE-30-29-22
576	WILSON CREEK	93° 22' 39.330" W	37° 11' 38.117" N	466488	4116451	NW-30-29-22
577	WILSON CREEK	93° 22' 50.306" W	37° 11' 38.895" N	466218	4116476	NW-30-29-22
578	PEARSON CREEK	93° 10' 21.474" W	37° 13' 46.755" N	484686	4120363	SE-12-29-21
579	PEARSON CREEK	93° 10' 20.034" W	37° 13' 47.416" N	484721	4120383	SE-12-29-21
580	PEARSON CREEK	93° 10' 18.296" W	37° 13' 45.714" N	484764	4120330	SE-12-29-21
581	PEARSON CREEK	93° 10' 20.567" W	37° 13' 43.116" N	484708	4120250	SE-12-29-21
582	WILSON CREEK	93° 22' 34.102" W	37° 11' 20.049" N	466615	4115894	SE-30-29-22
583	WILSON CREEK	93° 22' 19.524" W	37° 11' 43.911" N	466977	4116628	NE-30-29-22
584	WARD BRANCH	93° 19' 9.176" W	37° 7' 7.189" N	471641	4108083	NE-22-28-22
585	WARD BRANCH	93° 19' 9.333" W	37° 7' 2.483" N	471637	4107938	NE-22-28-22
586	JAMES RIVER	93° 21' 8.390" W	37° 5' 58.134" N	468691	4105966	SW-28-28-22
587	JAMES RIVER	93° 20' 57.191" W	37° 5' 55.805" N	468968	4105893	SW-28-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
588	JAMES RIVER	93° 21' 1.954" W	37° 5' 48.563" N	468849	4105670	SW-28-28-22
589	WILSON CREEK	93° 21' 42.987" W	37° 7' 53.850" N	467851	4109535	NW-17-28-22
590	WILSON CREEK	93° 23' 44.360" W	37° 12' 14.872" N	464890	4117590	SW-24-29-23
591	SOUTH DRY SAC	93° 16' 28.845" W	37° 16' 8.677" N	475646	4124757	E 1/2 LOT 6-01-29-22
592	SOUTH DRY SAC	93° 16' 36.482" W	37° 16' 8.249" N	475458	4124745	E 1/2 LOT 6-01-29-22
593	WARD BRANCH	93° 20' 34.085" W	37° 7' 53.291" N	469551	4109511	NW-16-28-22
594	WARD BRANCH	93° 20' 41.821" W	37° 7' 53.160" N	469360	4109508	NW-16-28-22
595	WARD BRANCH	93° 20' 43.589" W	37° 7' 52.726" N	469316	4109495	NW-16-28-22
596	WARD BRANCH	93° 20' 33.017" W	37° 7' 55.114" N	469577	4109567	NW-16-28-22
597	WARD BRANCH	93° 20' 32.733" W	37° 7' 52.321" N	469584	4109481	NW-16-28-22
598	PEARSON CREEK	93° 11' 57.429" W	37° 13' 12.037" N	482319	4119297	NW-14-29-21
599	PEARSON CREEK	93° 11' 56.301" W	37° 13' 12.541" N	482347	4119313	NW-14-29-21
600	WILSON CREEK	93° 22' 7.737" W	37° 11' 39.608" N	467267	4116494	NE-30-29-22
601	SPRING BRANCH	93° 19' 27.962" W	37° 15' 56.105" N	471233	4124384	W 1/2 LOT 5-03-29-22
602	WILSON CREEK	93° 22' 16.447" W	37° 11' 39.354" N	467053	4116487	NE-30-29-22
603	WARD BRANCH	93° 19' 50.993" W	37° 7' 1.269" N	470609	4107905	NW-22-28-22
604	PEARSON CREEK	93° 11' 52.783" W	37° 13' 26.789" N	482434	4119752	SW-11-29-21
605	PEARSON CREEK	93° 11' 51.385" W	37° 13' 27.000" N	482469	4119758	SE-11-29-21
606	PEARSON CREEK	93° 12' 5.542" W	37° 11' 40.349" N	482113	4116472	SW-23-29-21
607	JAMES RIVER	93° 16' 22.738" W	37° 5' 59.477" N	475742	4105984	SE-30-28-21
608	JAMES RIVER	93° 16' 40.870" W	37° 6' 10.767" N	475296	4106333	NW-30-28-21
609	JAMES RIVER	93° 16' 45.883" W	37° 6' 28.513" N	475174	4106880	NE-25-28-22
610	JAMES RIVER	93° 20' 49.194" W	37° 6' 58.455" N	469172	4107823	SW-21-28-22
611	WILSON CREEK	93° 21' 29.221" W	37° 11' 18.590" N	468214	4115843	SE-29-29-22
612	JAMES RIVER	93° 21' 2.381" W	37° 7' 2.784" N	468847	4107958	NW-21-28-22
613	JAMES RIVER	93° 21' 2.288" W	37° 7' 4.066" N	468849	4107997	NW-21-28-22
614	JAMES RIVER	93° 20' 54.861" W	37° 7' 1.098" N	469032	4107905	NW-21-28-22
615	JAMES RIVER	93° 20' 51.933" W	37° 7' 0.610" N	469105	4107890	NW-21-28-22
616	JAMES RIVER	93° 20' 52.073" W	37° 7' 5.000" N	469102	4108025	NW-21-28-22
617	WARD BRANCH	93° 19' 29.611" W	37° 8' 2.015" N	471143	4109775	NW-15-28-22
618	WARD BRANCH	93° 19' 30.824" W	37° 8' 3.223" N	471113	4109812	NW-15-28-22
620*	WARD BRANCH	93° 19' 3.660" W	37° 6' 59.233" N	471776	4107838	SE-22-28-22
626*	JAMES RIVER	93° 20' 52.442" W	37° 6' 59.260" N	469092	4107848	SW-21-28-22
627	JAMES RIVER	93° 20' 39.351" W	37° 6' 51.530" N	469414	4107609	SW-21-28-22
628	SOUTH DRY SAC	93° 17' 23.339" W	37° 16' 35.800" N	474306	4125597	SW-31-30-21
629	PEA RIDGE CREEK	93° 17' 23.637" W	37° 15' 52.322" N	474295	4124258	W 1/2 LOT 5-01-29-22
630	PEA RIDGE CREEK	93° 17' 26.843" W	37° 15' 51.942" N	474216	4124246	W 1/2 LOT 5-01-29-22
631	PEA RIDGE CREEK	93° 17' 30.204" W	37° 15' 51.858" N	474133	4124244	W 1/2 LOT 5-01-29-22
632	WILSON CREEK	93° 22' 9.947" W	37° 11' 32.460" N	467212	4116274	NE-30-29-22
633	WILSON CREEK	93° 22' 3.203" W	37° 11' 39.499" N	467379	4116490	NW-29-29-22
634	SOUTH CREEK	93° 21' 9.051" W	37° 10' 21.029" N	468705	4114067	SE-32-29-22
635	PEA RIDGE CREEK	93° 19' 0.310" W	37° 15' 58.184" N	471915	4124446	E 1/2 LOT 5-03-29-22
636	WILSON CREEK	93° 22' 4.176" W	37° 10' 51.957" N	467349	4115025	NW-32-29-22
637	WILSON CREEK	93° 23' 51.262" W	37° 12' 14.398" N	464720	4117577	SW-24-29-23
638	WILSON CREEK	93° 24' 1.627" W	37° 12' 7.533" N	464463	4117366	SW-24-29-23
639	PEARSON CREEK	93° 11' 0.457" W	37° 13' 38.133" N	483725	4120099	SW-12-29-21
640	PEARSON CREEK	93° 11' 55.809" W	37° 13' 25.317" N	482360	4119707	SW-11-29-21
641	PEARSON CREEK	93° 11' 45.088" W	37° 13' 30.238" N	482624	4119858	SE-11-29-21

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
642	PEARSON CREEK	93° 11' 45.453" W	37° 13' 30.151" N	482615	4119855	SE-11-29-21
643	INMAN CREEK	93° 21' 8.297" W	37° 9' 30.360" N	468718	4112506	SE-05-28-22
644	JAMES RIVER	93° 16' 37.235" W	37° 6' 40.788" N	475388	4107258	SW-19-28-21
645	PEA RIDGE CREEK	93° 18' 59.042" W	37° 15' 55.989" N	471946	4124378	E 1/2 LOT 5-03-29-22
646	WARD BRANCH	93° 20' 33.293" W	37° 7' 51.568" N	469570	4109458	SW-16-28-22
647	WARD BRANCH	93° 19' 27.814" W	37° 6' 49.475" N	471179	4107539	SE-22-28-22
648	JAMES RIVER	93° 16' 31.811" W	37° 6' 49.798" N	475523	4107535	SW-19-28-21
649	JAMES RIVER	93° 16' 26.378" W	37° 6' 47.054" N	475657	4107450	SW-19-28-21
650	WARD BRANCH	93° 19' 31.100" W	37° 6' 48.771" N	471098	4107518	SW-22-28-22
651	WILSON CREEK	93° 22' 35.658" W	37° 10' 39.952" N	466572	4114659	NE-31-29-22
652	PEARSON CREEK	93° 11' 50.784" W	37° 13' 6.789" N	482482	4119135	NE-14-29-21
653	SPRING BRANCH	93° 19' 10.831" W	37° 15' 52.447" N	471655	4124270	W 1/2 LOT 5-03-29-22
654	PEARSON CREEK	93° 11' 50.732" W	37° 13' 7.523" N	482484	4119158	NE-14-29-21
655	WARD BRANCH	93° 19' 25.038" W	37° 6' 50.495" N	471248	4107570	SE-22-28-22
656	WILSON CREEK	93° 22' 17.302" W	37° 10' 40.478" N	467024	4114673	NE-31-29-22
657	PEARSON CREEK	93° 12' 39.419" W	37° 10' 56.735" N	481275	4115130	SE-27-29-21
658	JAMES RIVER	93° 16' 28.654" W	37° 6' 48.041" N	475601	4107481	SW-19-28-21
659	WILSON CREEK	93° 22' 28.148" W	37° 10' 45.604" N	466758	4114832	NE-31-29-22
660	JAMES RIVER	93° 16' 32.874" W	37° 6' 44.864" N	475496	4107383	SW-19-28-21
661	WILSON CREEK	93° 22' 27.178" W	37° 10' 45.942" N	466782	4114842	NE-31-29-22
662	JAMES RIVER	93° 17' 2.385" W	37° 6' 34.704" N	474767	4107072	SE-24-28-22
663	WARD BRANCH	93° 19' 11.511" W	37° 7' 10.463" N	471584	4108184	NE-22-28-22
664	PEARSON CREEK	93° 12' 6.453" W	37° 10' 51.928" N	482087	4114980	SW-26-29-21
665	JAMES RIVER	93° 17' 2.419" W	37° 6' 33.034" N	474766	4107021	SE-24-28-22
666	WARD BRANCH	93° 19' 14.697" W	37° 7' 34.986" N	471508	4108940	SE-15-28-22
667	PEARSON CREEK	93° 12' 8.395" W	37° 10' 55.625" N	482040	4115094	SW-26-29-21
668	PEARSON CREEK	93° 12' 16.198" W	37° 10' 26.450" N	481845	4114196	NW-35-29-21
669	WARD BRANCH	93° 20' 17.017" W	37° 7' 57.683" N	469973	4109645	NE-16-28-22
670	SOUTH CREEK	93° 21' 27.852" W	37° 9' 11.833" N	468233	4111937	NE-08-28-22
671	WARD BRANCH	93° 20' 17.865" W	37° 7' 2.933" N	469946	4107958	NE-21-28-22
672	WARD BRANCH	93° 18' 17.736" W	37° 7' 24.780" N	472912	4108621	NE-23-28-22
673	INMAN CREEK	93° 21' 25.344" W	37° 9' 19.696" N	468296	4112179	SE-05-28-22
674	SOUTH DRY SAC	93° 15' 12.104" W	37° 15' 58.764" N	477535	4124447	W 1/2 LOT 6-05-29-21
675	SOUTH DRY SAC	93° 15' 6.987" W	37° 15' 50.724" N	477661	4124199	W 1/2 LOT 5-05-29-21
676	WARD BRANCH	93° 18' 12.326" W	37° 7' 30.859" N	473046	4108808	SE-14-28-22
677	PEARSON CREEK	93° 12' 10.819" W	37° 10' 59.914" N	481980	4115227	SW-26-29-21
678	WARD BRANCH	93° 17' 38.856" W	37° 7' 57.625" N	473875	4109630	NW-13-28-22
679	JAMES RIVER	93° 20' 43.688" W	37° 7' 25.973" N	469311	4108670	NW-21-28-22
680	WILSON CREEK	93° 20' 47.337" W	37° 8' 22.095" N	469227	4110400	SW-09-28-22
681	PEARSON CREEK	93° 11' 55.529" W	37° 13' 10.748" N	482366	4119258	NW-14-29-21
682	INMAN CREEK	93° 20' 34.825" W	37° 9' 28.511" N	469543	4112446	SW-04-28-22
683	INMAN CREEK	93° 20' 40.816" W	37° 9' 28.652" N	469396	4112451	SW-04-28-22
684	WARD BRANCH	93° 18' 22.496" W	37° 6' 40.309" N	472790	4107251	SE-23-28-22
685	WARD BRANCH	93° 18' 22.959" W	37° 6' 34.866" N	472778	4107084	SE-23-28-22
686	WARD BRANCH	93° 20' 31.350" W	37° 7' 52.177" N	469618	4109477	SE-16-28-22
687	WARD BRANCH	93° 20' 31.746" W	37° 7' 46.006" N	469608	4109287	SE-16-28-22
688	WARD BRANCH	93° 20' 32.670" W	37° 7' 17.175" N	469582	4108398	NE-21-28-22
689	JAMES RIVER	93° 20' 43.594" W	37° 7' 25.560" N	469313	4108658	NW-21-28-22

Outfall ID	Watershed	Longitude	Latitude	East	North	STR
690	WARD BRANCH	93° 20' 20.143" W	37° 8' 5.976" N	469896	4109901	NE-16-28-22
691	WARD BRANCH	93° 20' 13.918" W	37° 8' 9.127" N	470050	4109998	NE-16-28-22
692	WARD BRANCH	93° 20' 20.106" W	37° 8' 5.426" N	469897	4109884	NE-16-28-22
693	JAMES RIVER	93° 17' 9.135" W	37° 6' 26.105" N	474600	4106808	NE-25-28-22
694	PEA RIDGE CREEK	93° 18' 0.455" W	37° 15' 49.272" N	473388	4124166	E 1/2 LOT 5-02-29-22
695	JAMES RIVER	93° 18' 6.657" W	37° 6' 33.584" N	473181	4107043	SE-23-28-22
696	PEARSON CREEK	93° 11' 41.288" W	37° 11' 36.784" N	482711	4116361	NE-26-29-21
697	PEARSON CREEK	93° 12' 7.178" W	37° 13' 6.362" N	482078	4119123	NW-14-29-21
698	JAMES RIVER	93° 21' 2.024" W	37° 6' 16.876" N	468851	4106543	NW-28-28-22
699	PEARSON CREEK	93° 12' 27.142" W	37° 11' 16.844" N	481579	4115749	NE-27-29-21
700	PEARSON CREEK	93° 10' 54.368" W	37° 13' 49.370" N	483875	4120445	NW-12-29-21
701	PEARSON CREEK	93° 10' 53.194" W	37° 13' 49.155" N	483904	4120438	NW-12-29-21
702	WILSON CREEK	93° 20' 25.645" W	37° 8' 10.142" N	469761	4110030	NE-16-28-22
703	WARD BRANCH	93° 20' 29.558" W	37° 8' 1.925" N	469664	4109777	NE-16-28-22
704	INMAN CREEK	93° 21' 16.362" W	37° 9' 10.922" N	468517	4111907	NE-08-28-22
705	INMAN CREEK	93° 21' 15.732" W	37° 9' 11.060" N	468532	4111912	NE-08-28-22
706	INMAN CREEK	93° 21' 7.970" W	37° 9' 10.331" N	468724	4111888	NE-08-28-22
707	INMAN CREEK	93° 21' 8.222" W	37° 9' 10.976" N	468718	4111908	NE-08-28-22
708	PEARSON CREEK	93° 12' 36.914" W	37° 10' 48.896" N	481336	4114888	SE-27-29-21
709	PEARSON CREEK	93° 12' 36.928" W	37° 10' 48.777" N	481336	4114885	SE-27-29-21
710	PEARSON CREEK	93° 12' 36.701" W	37° 10' 49.202" N	481341	4114898	SE-27-29-21
711	WARD BRANCH	93° 19' 27.481" W	37° 7' 0.497" N	471189	4107879	NE-22-28-22
712	WARD BRANCH	93° 19' 42.288" W	37° 7' 7.216" N	470824	4108087	NW-22-28-22
713	JAMES RIVER	93° 20' 51.950" W	37° 5' 59.909" N	469097	4106019	SW-28-28-22
714	PEARSON CREEK	93° 12' 54.862" W	37° 10' 50.738" N	480894	4114946	SE-27-29-21
715	PEA RIDGE CREEK	93° 17' 28.900" W	37° 15' 50.795" N	474165	4124211	W 1/2 LOT 5-01-29-22
719*	PEARSON CREEK	93° 11' 5.214" W	37° 13' 47.778" N	483608	4120396	SW-12-29-21
720	WARD BRANCH	93° 19' 55.872" W	37° 8' 2.465" N	470495	4109791	NW-15-28-22
721	PEARSON CREEK	93° 12' 49.985" W	37° 10' 39.231" N	481013	4114591	NE-34-29-21
722	WILSON CREEK	93° 21' 10.483" W	37° 7' 55.412" N	468653	4109580	NE-17-28-22
723	JAMES RIVER	93° 13' 11.599" W	37° 6' 59.977" N	480465	4107836	NW-22-28-21
724	PEARSON CREEK	93° 10' 59.196" W	37° 13' 36.684" N	483756	4120054	SW-12-29-21
725	SOUTH DRY SAC	93° 15' 26.609" W	37° 16' 9.059" N	477179	4124765	W 1/2 LOT 6-05-29-21
726	SOUTH DRY SAC	93° 15' 25.139" W	37° 16' 9.314" N	477215	4124773	W 1/2 LOT 6-05-29-21
727	SOUTH DRY SAC	93° 16' 8.272" W	37° 16' 10.598" N	476153	4124815	E 1/2 LOT 6-06-29-21
728	PEA RIDGE CREEK	93° 18' 54.388" W	37° 15' 50.067" N	472060	4124195	E 1/2 LOT 5-03-29-22
729	PEA RIDGE CREEK	93° 18' 58.310" W	37° 15' 52.884" N	471963	4124282	E 1/2 LOT 5-03-29-22
730	SOUTH DRY SAC	93° 15' 10.901" W	37° 15' 45.621" N	477564	4124042	W 1/2 LOT 5-05-29-21

*Note: numbering discontinuities result from the original outfall delineation including several points located within municipal boundaries. These points were removed during data review, but all other points kept their original outfall number.



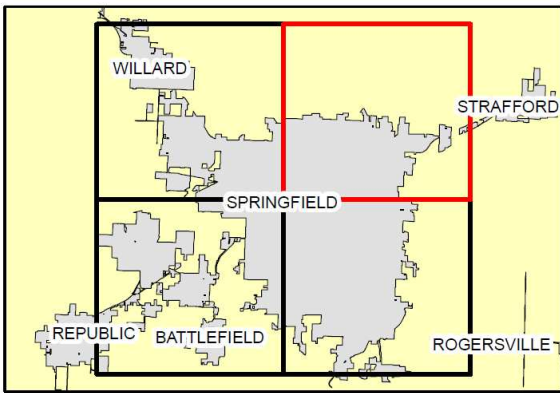
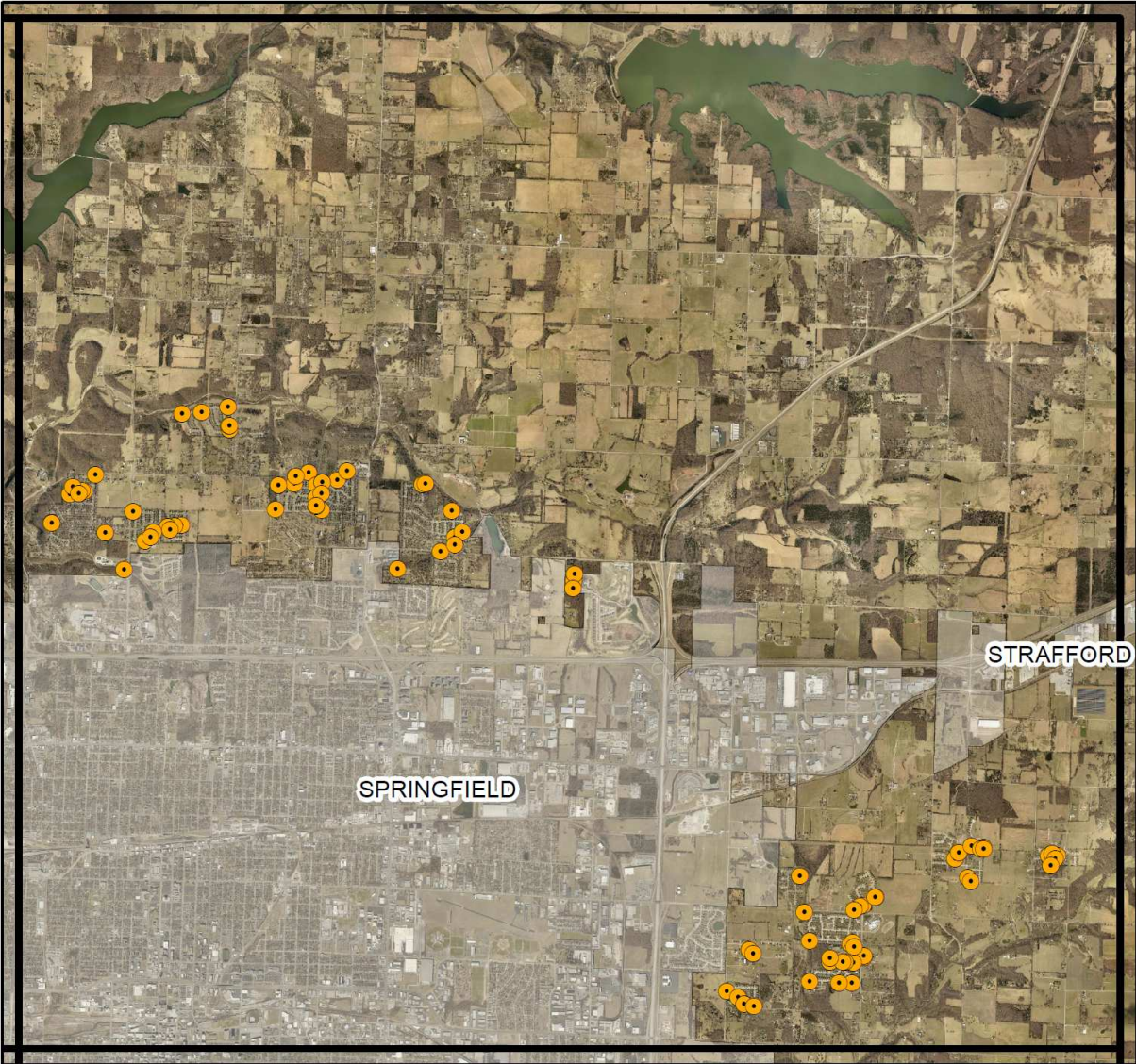
Page 1 of 4

● MS4 Outlet



0 5 10 Miles





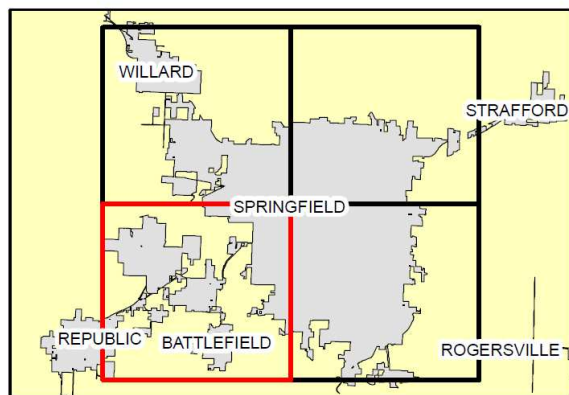
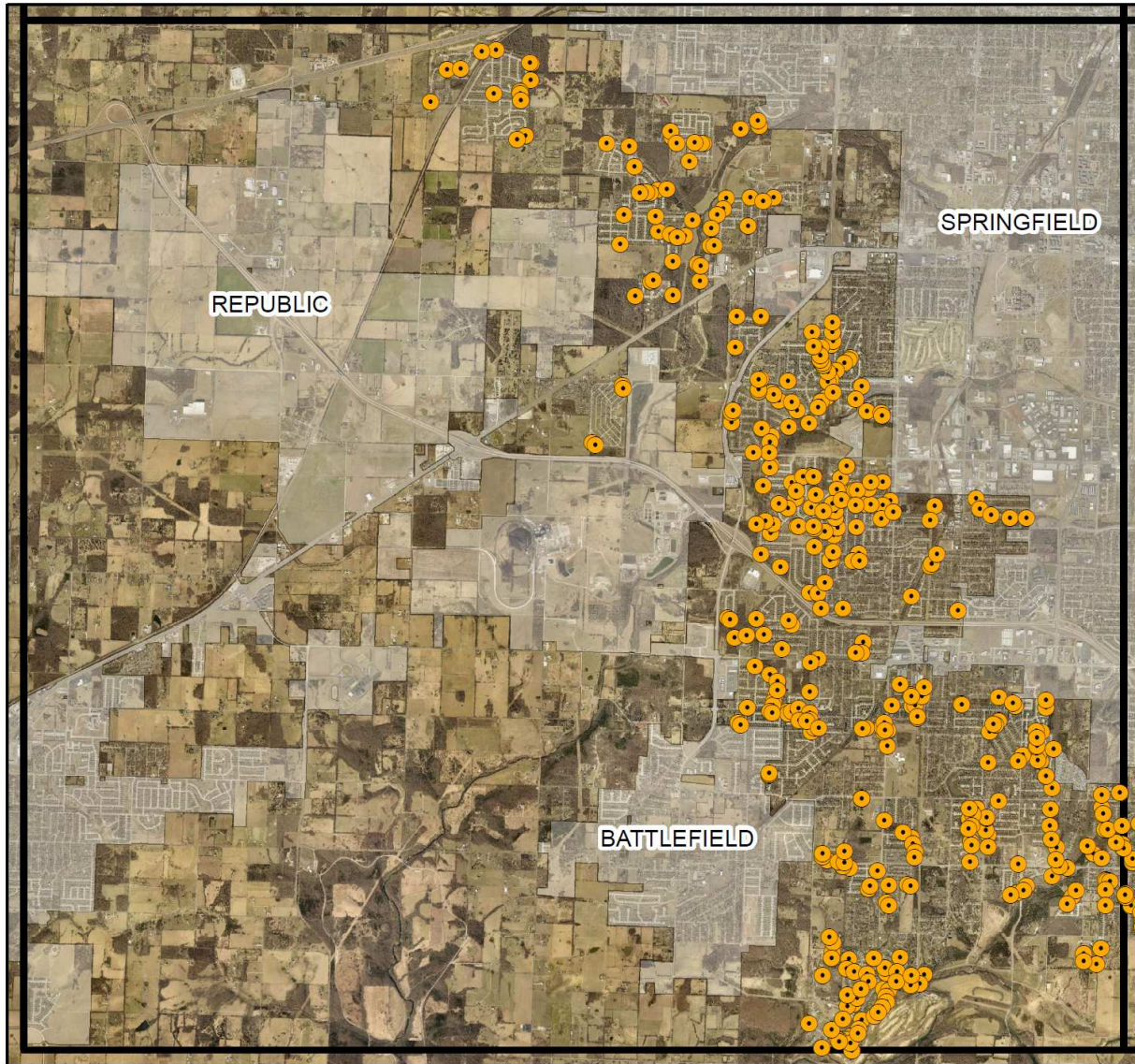
Page 2 of 4

● MS4 Outlet



0 5 10 Miles





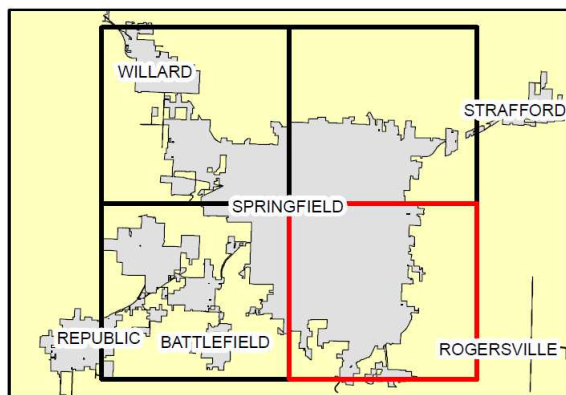
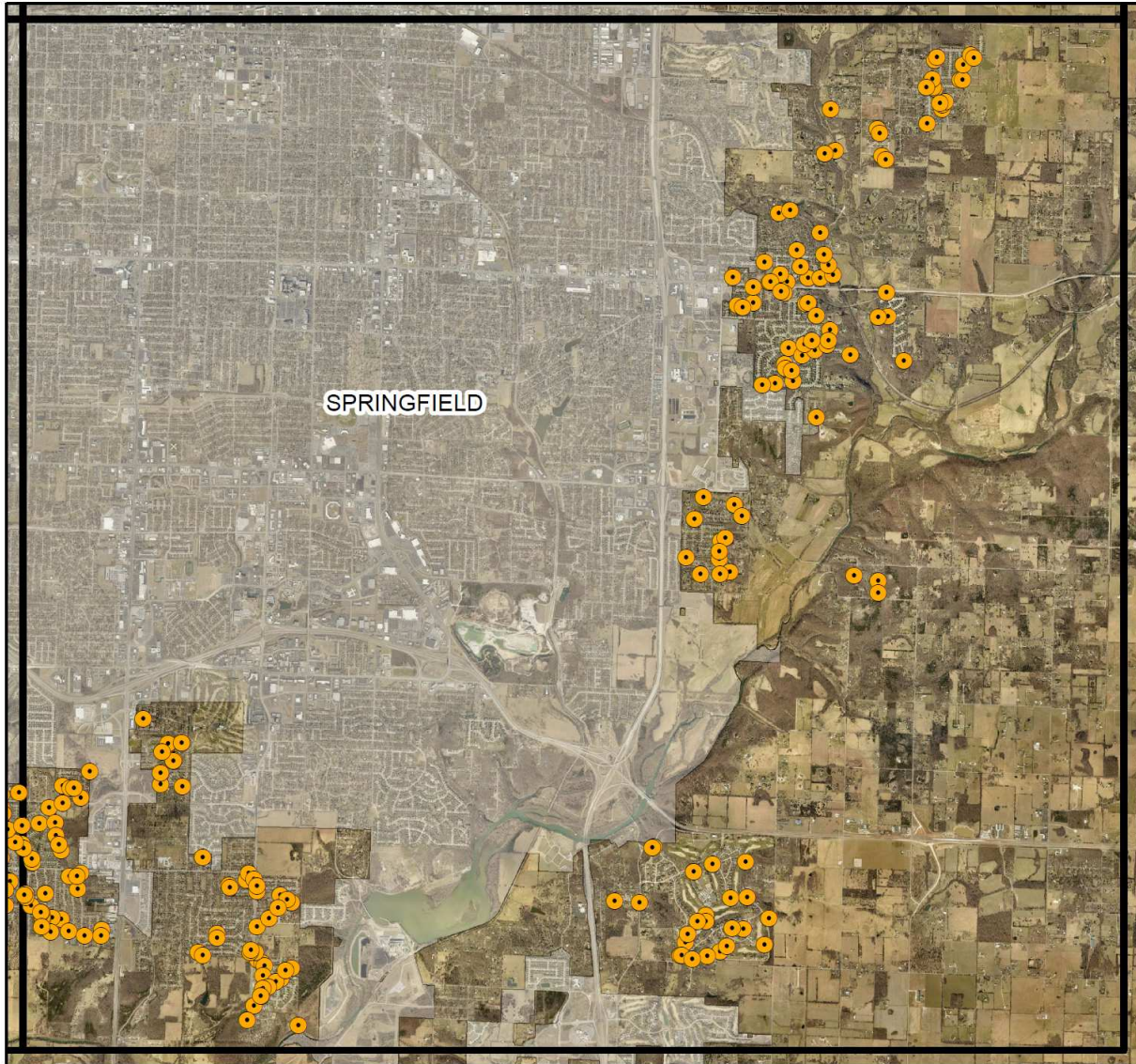
Page 3 of 4

● MS4 Outlet



0 5 10 Miles





Page 4 of 4

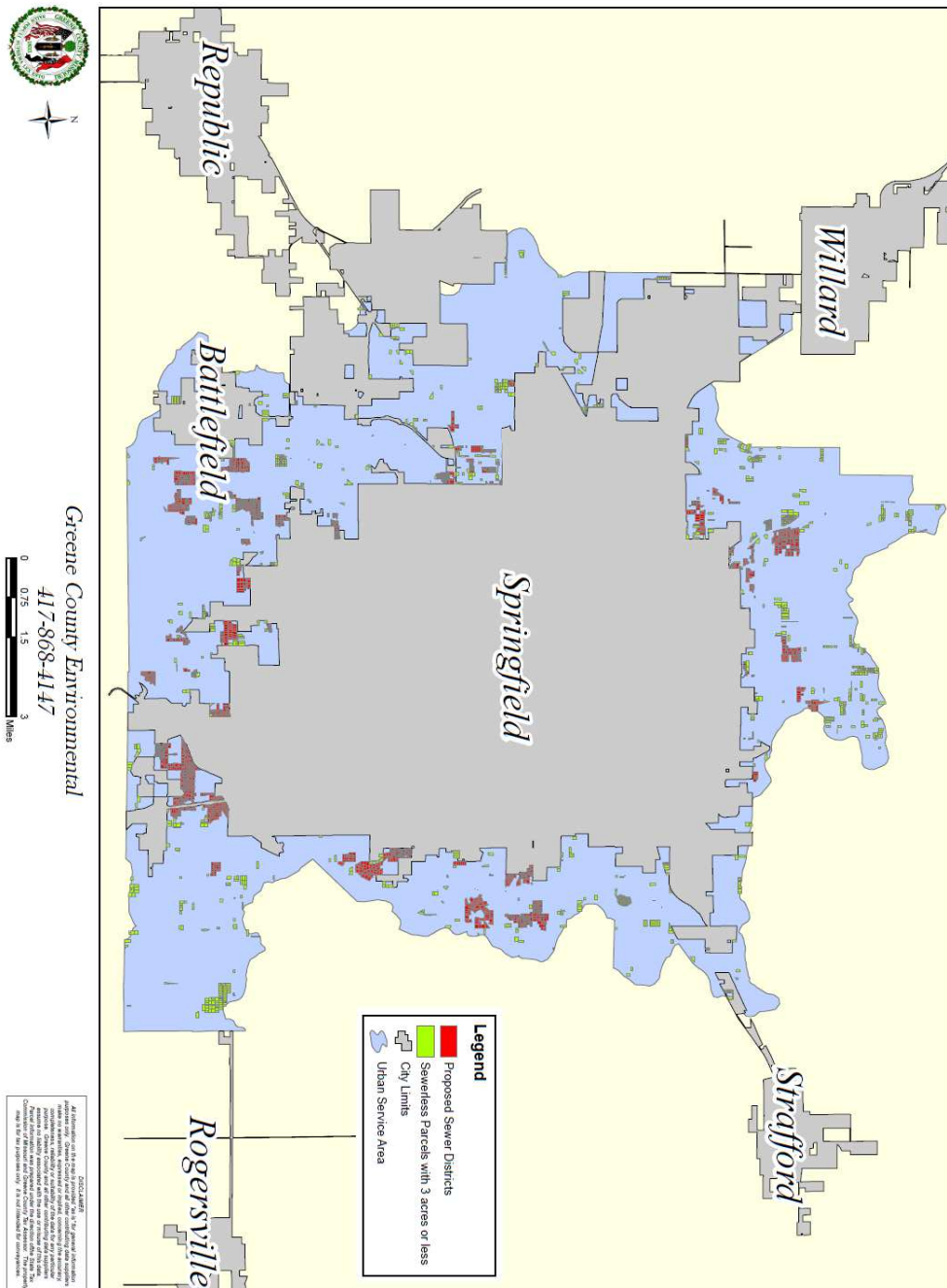
● MS4 Outlet



0 5 10 Miles



Greene County Proposed Sewer Districts



This page intentionally left blank

APPENDIX H:

Construction Site Storm Water Runoff Control Program

- Greene County Grading Permit Application
http://www.greenecountymo.org/file/resource_management/env_grading_permit_app.pdf
- SWPPP Template
http://www.greenecountymo.org/file/resource_management/env_swppp.doc
- Security Agreement for Subdivisions
<https://greenecountymo.gov/files/PDF/file.pdf?id=1541>
- Inspection Checklist

LAND DISTURBANCE INSPECTION CHECKLIST**Greene County, MO****Resource Management Department****940 Boonville Ave, Springfield, MO 65802 ph: 417-868-4147 fx: 417-868-4163**

This form can be used for either private building and development self-inspections or by city inspection staff.
For Self-Inspections this form is to be filled out at least once per seven calendar days, or within a reasonable time period (not to exceed 48 hours) of a rainfall event which causes stormwater runoff to occur on-site. This form is to be attached to the project's SWPPP and kept on-site according to federal and state regulations.

Date of Inspection: _____ **Project Name:** _____

Grading Permit Number: _____ **Contractor:** _____

Location of Sediment/pollutant discharge: _____

Inspected by: _____ **Date of Last Rain:** _____ **Rain Amount:** _____

Inspection Type: ☐ Weekly ☐ Rainfall Event ☐ Complaint ☐ Drive By ☐ Pre-Con ☐ Final

INSPECTION CHECKLIST

	Satisfactory	Deficient	N/A
1. SWPPP is on site and updated with records attached?	☐	☐	☐
2. Sign/notice is posted at construction site?	☐	☐	☐
3. Erosion/sediment control BMPs installed according to SWPPP?	☐	☐	☐
4. Mud tracking is controlled at construction entrance/exit?	☐	☐	☐
5. Streets and other property are free of sediment?	☐	☐	☐
6. Litter, construction debris, and construction chemicals are controlled?	☐	☐	☐
7. Disturbed areas are stabilized after activity has ceased for 14 days?	☐	☐	☐
8. Sedimentation basins/traps are properly installed/maintained?	☐	☐	☐
9. Perimeter protection BMPs are properly installed/maintained?	☐	☐	☐
10. Discharge location's erosion control devices are adequate?	☐	☐	☐
11. Ditch checks/channel linings are installed/established/maintained?	☐	☐	☐
12. Diversion channels/slope drains are properly installed/maintained?	☐	☐	☐
13. Inlet protections for active inlets are properly installed/maintained?	☐	☐	☐
14. Streams/sinkholes are protected from sediment?	☐	☐	☐
15. Permanent stabilization measures are properly installed/maintained?	☐	☐	☐
16. Dewatering operations are filtering sediment/pollutants?	☐	☐	☐
17. Stockpiles are stabilized or contained by a BMP?	☐	☐	☐
18. Have all temporary BMPs that are no longer needed been removed?	☐	☐	☐
19. Have all control BMPs been repaired/sediment accumulation removed?	☐	☐	☐
20. Other _____	☐	☐	☐

Areas Where Land Disturbance Has Ceased _____

Areas of Concern (attach additional sheets if needed): _____

Recommendations (attach additional sheets if needed): _____

Verbal ☐ **Written** ☐ **Notification Given To (If applicable):** _____

Inspector's Signature: _____ **Date** _____

APPENDIX I:

Pollution Prevention/Good Housekeeping

- Pollution Prevention/Good Housekeeping in Municipal Operations: Operation and Maintenance Manual
- Spill Prevention Control and Countermeasures (SPCC) Plan

Operation and Maintenance Program For Pollution Prevention/Good Housekeeping in Municipal Operations



Greene County, Missouri

Municipal Separate Storm Sewer System (MS4)

Permit # MO-R040014



TABLE OF CONTENTS

Purpose Statement.....	3
Fleet Maintenance	4
De-Icing Operations.....	7
Waste Management.....	9
Street Sweeping	10
Vehicle Washing	11
Vehicle Fueling	12
Herbicide Storage and Use.....	13
Paving Striping and Marking.....	15
Road Maintenance	17
References	19
Parts Solvent SDS: Mineral Spirits 106 and 142	Appendix A
MDNR Solid Waste Guidance.....	Appendix B
MDNR Small Fuel Spill Guidance	Appendix C
Gly-4 Herbicide SDS and Label	Appendix D
Element 3A Herbicide SDS and Label.....	Appendix E
Gordon's Brush Killer Herbicide SDS and Label.....	Appendix F
Ennis Waterborne Road Paint SDS	Appendix G

PURPOSE STATEMENT

This operation and maintenance plan provides guidance on the prevention of stormwater pollution during routine functions of the Greene County Highway Department. This plan provides a written explanation of Greene County's compliance with the requirements found in Missouri State Storm Water Regulations found in 10 CSR 20-6.200 and Section 4.2.6 of the Municipal Separate Storm Sewer System (MS4) permit number MO-R040014 issued to Greene County by the Missouri Department of Natural Resources (MDNR).

Fleet Maintenance



POLLUTANT CONCERN

Vehicle maintenance activities can result in a variety of possible stormwater pollutants. Motor oil, transmission oil, brake fluid, engine coolant, and multiple other fluids must be appropriately stored, used, and disposed of to prevent water pollution. These fluids can be directly toxic to plants and animals that are exposed, they carry other toxic materials such as metals, and they can pose a risk to human health.

OPERATIONS SUMMARY

The Greene County Highway Department is responsible for the maintenance and repair of 390 Greene County vehicles ranging from light vehicles to tracked excavators. Vehicle maintenance and repair is performed indoors in a 20 bay facility. The bays are large enough to accommodate even the largest pieces of equipment owned by Greene County, allowing all vehicle maintenance work to be done indoors protected from exposure to rainfall.

MATERIALS STORAGE

All bulk storage containers for petroleum products and chemicals used for vehicle maintenance are stored inside the service bays or in the parts warehouse. All oil and other fluids used in vehicle maintenance are stored inside (see the SPCC plan for the Clifton facility for specific details on storage location, quantities, and secondary containment for petroleum products).

WASTE GENERATION, STORAGE AND DISPOSAL

All used oil and other petroleum products are drained from vehicles into drip pans that funnel the oil into steel roller containers built specifically for the purpose of collecting used oil. Once full, the inflow valve is closed and a hose from the container drum is connected to a 1,000 gallon double walled steel tank on the west side of the North Shop. The drum can then be pressurized with compressed air to pump the used oil into the 1,000 gallon used oil holding tank. The heavy equipment bay in the North Shop is equipped with a steel oil sump which is directly plumbed into the 1,000 gallon steel holding tank. An air actuated pump on the used oil tank pumps the oil directly from the heavy equipment bay to the used oil tank. The sump in the heavy equipment bay does not have a floor drain and can be emptied only via pumping. Used oil from the 1,000 gallon holding tank is collected by Heritage-Crystal Clean for recycling, usually once per month. Heritage-Crystal Clean is called when the holding tank reached 1/2-3/4 full (500-750 gallons). Three viscosity weights of new oil are kept on hand and each is contained in a separate 125 gallon or 250 gallon steel roller drum. Smaller, commercially available size plastic jugs of various miscellaneous oil are stored in the parts warehouse between the vehicle service bays and the heavy equipment bay. A 250 gallon steel drum of hydraulic oil is located in the heavy equipment bay in

the North Shop. Details on petroleum product storage, secondary containment, and spill response can be found in the SPCC plan

Vehicle parts are cleaned with 106 or 142 mineral spirits solvents from Heritage-Crystal Clean. Parts are cleaned in a sink mounted on top of the 55 gallon steel drum which contains the solvent. An electric pump recirculates solvent from the drum onto the sink and the sink drains into the drum. This closed, self-contained system ensured no spillage of solvent liquid. Used solvent is collected by Heritage Crystal Clean on an as needed basis for recycling.

Spill kits are distributed throughout the vehicle maintenance facility. Each spill kit contains a roll of Pig Mat™ for use on oil drips and small spills. A minimum of four oil absorbent booms 6-8 feet long are also included in each spill kit for immediate containment of larger spills. Once the initial spill has been contained by the booms, the appropriate amount of absorbent can be obtained from the warehouse that adjoins each shop. When a New Pig™ mat is used the absorbed oil is wrung into an appropriate oil pan for transfer to the 1,000 gallon storage tank. The New Pig™ mat is either re-used or placed in the trash for transfer to the landfill.

Waste	Storage Location	Disposal Method	Disposal Frequency
Used Motor Oil, Hydraulic Fluid, and Transmission Fluid	1,000 gallon above ground tank	Collection by vendor for recycling	Before tank reaches 75% capacity
Used Oil Filters	Leak-proof bin after draining for 24 hours	Collection by vendor for recycling	As needed
Used Engine Coolant	2 -55 gallon drums in the South Shop	Recovery by vendor for recycling	As needed
Worn Brake Pads/Shoes	Warehouse	Recycled with metal	As needed
Used Lead-Acid Batteries	Designated bench in the South Shop	Collected by the manufacturer	As needed
Tires	Tire Shop	Collected by vendor	As needed
Scrap Metal		Recycled	As needed
Parts Cleaning Solvent	55 gallon recirculating drum	Recovery by waste vendor	As needed
Refrigerant	30 lb. cylinders in warehouse	Recovered for recycling	Recycled on-site

Contact information for the oil recovery and solvent vendor:

Heritage Crystal Clean
1135 N. Fr 123 #A
Springfield, MO 65802
417-865-4811
www.crystal-clean.com

POLLUTION PREVENTION PROCEDURES

- Use non-hazardous, environmentally safe products when possible. Avoid the use of chlorinated solvents
- All material and waste containers must be properly labeled for content identification
- Keep safety data sheets (SDS) on site for information on safety, handling, and reportable spill quantities for all materials on hand
- Store all supply materials and waste containers indoors to prevent contact with rainfall
- Ensure that waste oil, antifreeze, filters, and other waste are collected in designated labeled containers and recycled to the maximum extent practical
- Maintain a record of all waste pick-ups by the collection contractor
- Always use drip pans under vehicles when making or breaking fluid system connections
- Drain used oil filters for at least 24 hours with a hole punched in the filter dome or anti-back drain valve. Crush and collect filters for recycling
- Keep batteries and other fluids in secondary containment whenever possible
- Have spill kits available near battery and oil storage areas
- Keep neutralizer and absorbent by both new and used batteries
- Clean up any spills immediately using dry methods (absorbents).
- Keep the floor and working areas clean

De-Icing Operations



POLLUTANT CONCERN

Salt, in the form of sodium chloride (NaCl) is widely used on roadways to lower the freezing point of water to melt ice. This provides a safer driving surface for motorists when ice and snow would otherwise cover roads. When salt is washed off the roadway it can have detrimental environmental impacts. Elevated sodium chloride levels in soils inhibits water absorption and nutrient uptake in plants. Sodium and chloride in waterways can be directly toxic to aquatic life such as fish and aquatic insects. For these reasons Greene County will follow these steps to limit the amount of salt entering waterways to the maximum extent practicable.

OPERATIONS SUMMARY

The Greene County Highway Department spreads approximately 2,800 tons of salt on county roads through the course of a typical winter. The salt storage barn at the Greene County facility on N. Clifton provides covered storage for 1,300-1,400 tons of salt. Salt is loaded into spreader trucks with a front end loader. Salt that is spilled during loading is scooped back into the barn by the loader. Any salt that cannot be collected with the heavy equipment is swept back into the barn with a push broom. Between snow storms, all trucks with salt spreading equipment are stored in covered vehicle sheds. In the spring all salt spreading equipment is washed first at the large equipment wash located on the south end of the facility. All wash water goes through a grit separator, allowing the solid materials to settle out before the water enters the City of Springfield sanitary sewer system. All equipment is then washed with soap in the covered vehicle wash bay. All wash water from this facility likewise passes through a grit separator prior to discharge to the City of Springfield sanitary sewer system. The vehicles are then washed with a rust inhibitor in the vehicle wash bay. After washing in the spring, all salt spreading equipment is stored in covered vehicle sheds for the duration of inactivity during warm weather. In October all salt equipment is loaded onto the trucks and tested for mechanical functionality as part of a fall readiness drill. Any equipment that fails to function properly is either replaced or repaired prior to cold weather. Salt is also stored at the joint City/County facility located on Kaufmann Road. Trucks are not loaded for immediate spreading directly from the stockpile at this location due to accounting difficulties. All salt is dispensed to the spreader trucks from the N. Clifton facility. When this barn gets low salt is trucked in all at once from the Kaufmann Rd. facility to N. Clifton.

POLLUTION PREVENTION PROCEDURES

- Salt stockpiles must be stored indoors at all times
- Any salt spilled during loading activities must be immediately swept back into the salt barn
- Minimize the amount of salt used without compromising public safety
- Stop salt feed on trucks at stop signs/lights if the truck is equipped to do so

- All salt hoppers and spreaders are to be checked annually for mechanical functionality to prevent over-application of salt
- Each spring when the threat of snow has passed, all salt equipment is to be thoroughly washed
 - Wash equipment initially in the heavy equipment wash area
 - Following the initial wash with soap wash
 - Follow the soap wash with rust inhibitor
- Store all salt spreading equipment in covered equipment sheds

Waste Management

POLLUTANT CONCERN

Contaminants from solid and liquid wastes can runoff or leach into the ground when exposed to rain or otherwise improperly disposed of. The possible pollutants contained in the wide variety of waste collected and/or generated by the Highway Department can negatively impact waterways.



OPERATIONS SUMMARY

The Greene County Highway Department collects trash along the county rights of way both in response to citizen complaints and when a Highway Department crew sees some that needs to be collected. Trash collected directly by the Highway Department is stored at the N. Clifton facility until there's a quantity sufficient to take to the landfill. Most trash is collected by inmates of the Greene County Jail on a supervised work release program. Inmates gather the trash and place it in bags that are left on the roadside. The bags are then collected by the Highway Department and taken to the Springfield sanitary landfill. During a given year these efforts result in about 90 tons of trash removed from the county right of way.

POLLUTION PREVENTION PROCEDURES

- Properly store waste materials as far away from storm inlets and drainage ways as is practical
- Store solid wastes in appropriate containers (dumpsters) when feasible
- Do not dispose of hazardous or unknown materials in the landfill
- Containers of unknown liquids could potentially be hazardous; store such containers in a covered area protected from rainfall, have the material tested by a qualified contractor, and dispose of the material promptly according to contractor's recommendations
- Recycle materials when possible, appropriate, and feasible
- Keep the facility clean by promptly picking up any trash that can be blown around on a windy day
- Never clean/wash paint or concrete into the street or near a gutter or stormwater inlet

Street Sweeping

POLLUTANT CONCERN

The particulate matter that accumulates on roadway surfaces can contain a variety of pollutants such as trash, bacteria, pesticides, nutrients, metals, hydrocarbons (from vehicle leaks), and sediment. These pollutants come from a variety of sources such as vehicle emissions and wear and tear, atmospheric deposition, road surface deterioration, littering, etc. Regularly cleaning the streets with street sweepers plays an important role in keeping these pollutants from washing into the storm system during rainfall events.



OPERATIONS SUMMARY

The Greene County Highway Department operates two street sweeping trucks on a daily basis. The trucks sweep all streets within the urban services area. This includes most neighborhood streets and some county roads within the urban services area. Sweeper trucks do not sweep farm roads in the rural areas. One truck is assigned to the eastern portion of the urban services area and another to the west. Campbell Ave is the dividing line between these two areas of responsibility. Each truck completes a circuit of all streets within its assigned area approximately every 4-6 weeks before starting anew. The truck assigned to the east side of the county returns to the N. Clifton facility when it reaches capacity. It has the capability of raising the storage unit hydraulically to dump it into a dump truck. This is repeated several times a day and at the end of each day the dump truck containing the sweepings takes them to the sanitary landfill. The west side truck cannot raise its load high enough to empty into a dump truck so it must take the sweepings directly to the landfill several times a day. Loads tend to increase in the summer time when lawn clippings get into the street and are taken up by the sweepers. Sweeper trucks remove approximately 75 tons of trash and sediment from county roads each year.

POLLUTION PREVENTION PROCEDURES

- Properly maintain and operate the sweepers in accordance with the manufacturer's
- Take sweepings to the landfill the day they are collected or make sure swept material is stored in a covered area

Vehicle Washing

POLLUTANT CONCERN

When a vehicle is washed it is not just sediment that is washed away. A variety of pollutants that accumulate on roadways such as salt, metals, hydrocarbons (oil products), and pesticides can all attach to the dirt on the vehicle too. Even the soap itself if too highly concentrated can cause water quality problems. For this reason all wash water must be captured and treated before it enters a water way.



OPERATIONS SUMMARY

The vehicle wash bay at the Clifton facility is utilized by county vehicles from the Highway Department, County Sheriff, and vehicles assigned to the Juvenile, Assessor, and Resource Management offices. Vehicles are washed on an as-needed basis. All waste water from the vehicle washing bay passes through a sediment trap prior to flowing into the City of Springfield sanitary sewer system. The sediment trap is cleaned out on an as needed basis several times per year. Cleaning procedures require the removal of the lid and removal of the accumulated material with a backhoe and workers with shovels or with a vacuum truck depending on how solidly packed the material is. All removed material is hauled to the City of Springfield sanitary landfill. The wash bay is covered to prevent stormwater from entering the sanitary sewer system. All soap and rinse aids are stored in a separate room of the wash bay building protected from rain.

POLLUTION PREVENTION PROCEDURES

- Monitor grit separator on a routine basis
- Remove accumulated sediment and trash from the sediment trap quarterly, or as needed
- Keep soap, rinse aids, and other wash chemicals stored inside, protected from rainfall

Vehicle Fueling



POLLUTANT CONCERN

When petroleum products get into waterways it can affect human health as well as animals and plants. Petroleum products including oil, gasoline, and diesel fuel contain compounds that are toxic to aquatic life and harmful to humans. Petroleum products contain carcinogenic (cancer causing) compounds such as benzene. Even a very small amount of oil is sufficient to pollute a large quantity of water. One gallon of oil/fuel can pollute one million gallons of water.

OPERATIONS SUMMARY

The Greene County Highway Department's N. Clifton facility has four underground storage tanks (UST's) for fuel storage. Two interconnected 20,000 gallon tanks store diesel fuel and two interconnected tanks totaling 26,000 gallons store unleaded gasoline. All county owned vehicles refuel at the N. Clifton facility. The USTs are filled frequently to make sure they do not drop below 75% capacity as part of the Emergency Operations Center Contingency Plan for Greene County ensuring that police and first responders will have access to fuel in an emergency. The fuel island is equipped with an emergency shut off valve in case of a spill or damage to the pumps. These tanks are regulated under 40 CFR Part 268. The transfer of fuel both from the tanker to the tanks and from the tanks to vehicles is regulated under Spill Prevention Containment and Countermeasures (SPCC) regulations found in 40 CFR Part 112. For more specific information on the underground storage tanks see the SPCC plan for the Clifton Facility.

POLLUTION PREVENTION PROCEDURES

- Have a properly supplied spill kit at the fueling station
- Monitor tank filling operations for overfills and spills
- Stay with the vehicle during fueling and monitor to avoid overflows and leaks
- Do not top off vehicle fuel tanks
- Regularly inspect fuel dispensing equipment for leaks and mechanical failures
- Perform regular maintenance on the fuel dispensing equipment to ensure proper operation of emergency shut off devices on pumps
- Clean up all spills immediately using dry methods (absorbent material)

Herbicide Storage and Use



POLLUTION CONCERN

The Greene County Highway Department uses several different herbicides for control of vegetation within the right-of-way to maintain lines of sight and improve safety and appearance. Some of these chemicals can be acutely toxic to aquatic animals, including fish, if the herbicide is applied directly to a water body or to road ditches that can convey the chemical to a water body. All herbicides are toxic to plants, including aquatic plants. If the product enters waterways in sufficient concentrations the resulting loss of vegetation can reduce oxygen levels in the water and cause fish kills.

OPERATIONS SUMMARY

Herbicides used include Element 3A, 2-4D, and Gly-4 (glyphosate) for weed control along Greene County right of way. Element 3A is applied primarily via drip emitters on the ends of the blades on mowing rigs to control woody plants and broadleaf weeds. The sign maintenance crews also uses 2-4D and glyphosate (Gly-4) to control weeds and vegetation around road signs where mowers cannot reach. Approximately 150 gallons of herbicide is used on right of way in a given year in the treatment of 120 lane miles of roadway. Herbicides are mixed in the Bridge Maintenance Building. A spill absorption kit is present in the bridge maintenance building to clean up any herbicide that accidentally spills during mixing operations. See Safety Data Sheets in the Appendix.

MATERIALS STORAGE

All herbicide containers are stored in a locked, fire-proof steel container in the bridge maintenance building. Herbicide is stored in manufacturer's 2.5 gallon containers with 50 gallons being the maximum quantity on hand at any given time.

WASTE GENERATION AND DISPOSAL

Any spills that occur during product mixing are cleaned up immediately with absorbent material. Absorbent material is disposed of in accordance with the manufacturer's label. At the end of each day all herbicide tanks and drip lines used for applying Element 3A are flushed and the rinse water is captured in the herbicide containers and then re-used the following day. At the end of the mowing season all equipment is rinsed back into the herbicide containers and stored for use the following year. This results in no runoff of the product and no need to dispose of excess product. When containers are empty they are disposed of in the manner specified on the product label. Containers are triple rinsed into the mixing tank; containers are punctured to prevent re-use and then disposed of at the sanitary landfill.

POLLUTION PREVENTION PROCEDURES

- Follow all instructions on product labels and SDS (Safety Data Sheets) for storage, mixing, application, and disposal
- Follow all safety precautions on the product label and use appropriate personal protective equipment (PPE)
- Have a spill kit immediately accessible during mixing procedures
- Do not spray herbicides when rain is likely
- Do not spray herbicides over water or in roadside ditches where flowing water is present
- When cleaning application equipment do not pour wash water on the ground, capture the rinse water in herbicide containers for reuse when possible
- Make sure equipment is in good working condition and calibrated to spray herbicide at the correct application rate
- Store pesticides in the original containers and handle carefully to avoid spills

Pavement Striping and Marking



POLLUTANT CONCERN

The water-based striping paint used by the Greene County Highway Department is much less toxic than the solvent based alternative products on the market. However, the paint still contains chemicals such as methyl alcohol, propylene glycol, and butoxyethanol. These substances are toxic to humans and aquatic life and it is important to take steps to ensure that the liquid product does not end up in waterways.

OPERATIONS SUMMARY

The Greene County Highway Department uses water-based EP301Y3 MO Waterborne Paint Traffic paint used (yellow and white). Paint is stored in 250 gallon plastic cubical totes protected by metal cages. Spraying and striping occurs only in good weather without the chance of rain to ensure dry pavement necessary for good bonding with paint. This has an additional benefit of virtually eliminating the risk of wet paint being washed off by stormwater runoff. Paint is transferred from the storage totes to the spray truck via a hose and pump that transfers the paint directly into the spray tanks which greatly reduces the risk of spilled material.

MATERIALS STORAGE

Paint is ordered from Ennis Flint on an as-needed basis with 12 white totes and 6 yellow totes kept on hand during the summer peak application period. During summer the totes are stored outside due to lack of storage space adequate for 18 totes inside the shop bays. Two totes of each color are kept on hand throughout the winter. During the winter, totes are stored inside with the application equipment to protect it from the weather.

WASTE GENERATION AND DISPOSAL

During the summer season the striping crew will typically use 450 gallons of paint per day, or 6-7 totes of paint per four-day work week. Empty paint totes are collected by the manufacturer for recycling, re-use, or disposal. Following each day of spraying the spray nozzles are flushed with water at the Highway Department facility on N. Clifton. Nozzle flushing is done at the heavy equipment bay on the south side of the facility where discharge water is directed into the Springfield sanitary sewer. The safety data sheets (see appendix) for this product does not list any hazardous materials or give any specific guidance that would preclude rinsing residue down the sanitary sewer. Any excess paint left in the spray truck tanks at the end of the day is likewise flushed into the sanitary sewer system.

POLLUTION PREVENTION PROCEDURES

- Use only water based paints or thermoplastics rather than solvent based paints
- Apply road paint only during dry weather with no chance of rain the forecast
- Follow manufacturers recommendations and all state and federal guidelines on material handling
- Flush spray nozzles into the sanitary sewer system and not on the ground
- Keep spill cleanup material on hand at storage locations and on dispensing equipment

Road Maintenance

POLLUTANT CONCERN



Repair and maintenance activities performed on Greene County roads includes excavation, patching, grinding, resurfacing, sealing etc. These activities can generate a variety of pollutants including nutrients, sediment, trash, and hydrocarbons (benzene, toluene, ethylbenzene, and xylene). Excavation can generate sediment and the emulsions used on road resurfacing and patching can run off into ditch lines along the road. If not properly managed, these can all negatively impact waterways and human health.

OPERATIONS SUMMARY

The road network in Greene County consists of approximately 1,250 miles of roadway that must be maintained by the Greene County Highway Department. Maintenance activities consist primarily of repaving with cold mix asphalt. Cold mix is manufactured on site and on demand by Highway Department crews at the County-owned pug mill located at the Conco Quarries site near Willard. The pug mill used to generate cold mix asphalt is typically used during the warm months of May through September. Oil for the cold mix is not stored on site. For any batch that is to be mixed the Highways Department calls a day beforehand to Coastal Energy and Oil to arrange to have a tanker truck on site for mixing. The tanker truck is hooked directly to the mill via a hose and the oil is pumped into the mix. A conveyor transfers the mixed asphalt directly to waiting trucks for immediate transport to the construction site. MSHA (Mining Safety and Health Administration) rules are strictly observed and care is taken to ensure no oil is spilled on the ground. The small amount of oil that does drip is absorbed by the gravel on site. The gravel is then scooped up and placed in the hopper to be mixed in with the asphalt. New, clean gravel is then placed. The cold mix is typically used for resurfacing and edging of the pavement to prevent tire drop offs. The Highway Department averages 15 miles of road edging per year and used 1,400 tons of mix per mile. Cold mix is not stockpiled. Only the amount needed is produced.

POLLUTION PREVENTION PROCEDURES

- Non-emergency maintenance activities likely to generate pollutants that can be carried in stormwater runoff will be scheduled during times of dry weather if possible
- Recycle used asphalt and utilize used asphalt whenever possible
- For asphalt overlays, ensure stormwater drainage capacity of curbs and inlets is maintained by milling the existing asphalt at the curb or by using thin bonded overlay
- Minimize soil disturbance
- Implement erosion and sediment control BMPs for all projects that disturb soil, regardless of size
- Prevent paving materials from entering the storm drain system and road ditches

- Mix only the amount of cold-mix needed for each individual project to avoid the need for materials storage
- Do not apply cold mix asphalt if rain is in the forecast for the next 48 hours

References

King County Site management Plan. King County Department of Natural Resources and Parks Water and Land Resources Division Stormwater Services Section. 201 South Jackson Street, Suite 600, Seattle, WA 98104. May 2012. <http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/kc-stormwater-site-mgt-plan.pdf>

Metropolitan St. Louis Sewer District Phase II Model Operation and Maintenance Program. February 2005.
<http://dnr.mo.gov/env/wpp/stormwater/docs/MSD-OMmanual-template.pdf>

Novotony, Michael, and Winer, Rebecca. Urban Subwatershed Restoration Manual No. 9 Municipal Pollution Prevention/Good Housekeeping Practices Version 1.0. Center for Watershed Protection. Elliot City, MD. 2008.

Yaggi, Marc and Wegner, William. Environmental Impacts of Road Salt and Alternatives in the New York City Watershed. StormWater. June 30, 2001. http://www.stormh2o.com/SW/Articles/Environmental_Impacts_of_Road_Salt_and_Alternative_216.aspx

**SPILL PREVENTION CONTROL AND
COUNTERMEASURE (SPCC) PLAN
FOR
GREENE COUNTY HIGHWAY DEPARTMENT
CLIFTON AVE. OPERATIONS FACILITY**



Plan Date 8/31/15

CERTIFICATION INFORMATION

NAME OF FACILITY: Clifton Avenue Facility
TYPE OF FACILITY: Road and Fleet Maintenance
DATE OF INITIAL OPERATION: March 10, 1961
LOCATION OF FACILITY: 2065 N. Clifton Avenue
Springfield, MO 65803
NAME AND ADDRESS OF OWNER: Greene County Commission
933 N. Robberson Ave.
Springfield, MO 65802
(417) 868-4112

DESIGNATED PERSON(S) RESPONSIBLE FOR OIL SPILL PREVENTION

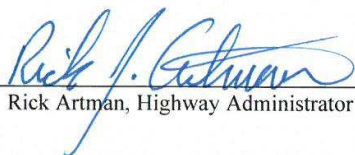

Jeff Deckard - Safety Officer


Tim Davis - Environmental Compliance
Manager

OIL SPILL HISTORY: None

MANAGEMENT APPROVAL: Full approval is extended by Management at a level
with authority to commit the necessary resources.

SIGNATURE:


Rick Artman, Highway Administrator

MANAGEMENT REVIEW PAGE
SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

In accordance with 40 CFR 112.5(b) a review and evaluation of this SPCC Plan is conducted at least once every five years. As a result of this review and evaluation, Greene County will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of the review. The Environmental Compliance Manager, or designee, will review the plan for conformance with current SPCC regulations. Greene County will amend the SPCC plan within six months after a change in the facility design, construction, operation, or maintenance occur which materially affects the facility's potential for discharge of oil into or upon navigable waters of the United States or adjoining shorelines.

Original Date of Plan: August 31, 2015

I have completed the review and evaluation of the Clifton Avenue Operations Facility SPCC Plan on the following date and have indicated below whether or not the Plan will be amended as a result of the review.

SIGNATURES

	Review Dates	Amend Plan? (Y/N)	Environmental Compliance Manager	Highway Department Safety Officer	Highway Department Administrator
1.	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____
7.	_____	_____	_____	_____	_____

TABLE OF CONTENTS

1.0 INTRODUCTION	5
2.0 FACILITY DESCRIPTION	5
2.1 Facility Operations.....	5
2.2 Facility Oil Storage	5
2.3 Drainage Pathway	9
2.4 Spill Prediction.....	9
3.0 DISCHARGE PREVENTION MEASURES	10
3.1 Drainage Control, Diversionary Structures, and Containment	11
3.2 Bulk Storage Tanks/Secondary Containment	11
3.3 Inspections, Maintenance, and Records.....	15
3.4 Personnel, Training, and Discharge Prevention Procedures.....	17
3.5 Security	17
3.6 Facility Tank Car and Tank Truck Loading/Unloading Rack	17
3.7 Facility Transfer Operations	18
4.0 DISCHARGE COUNTERMEASURES	18
4.1 Notifications/Emergency Contacts	19
4.2 Immediate Response Activities.....	20
4.3 Clean Up Activities.....	23
4.4 Waste Disposal.....	24
4.5 Spill Report	25
TABLES	
Table 1: Clifton Oil Storage.....	6
Table 2: Bulk Oil Storage Units.....	7
Table 3: Discharge Potential	10
Table 4: Bulk Oil Storage Construction Details	12
FIGURES	
Figure 1: Facility Map	6
Figure 2: Facility Drainage Paths	10
APPENDICES	
Appendix A – Monthly Inspection and Corrective Action Log	26
Appendix B – Spill Response Supplies and Equipment	30
Appendix C – Remediation Contractors	31
Appendix D – Internal Notification Call Out List	32
Appendix E – Oil Spill Report Form	33
Appendix F – Special Waste Disposal Request.....	35
Appendix G – Certification of the Applicability of the Substantial Harm Criteria Checklist	37

1.0 INTRODUCTION

This Spill Prevention, Control and Countermeasure (SPCC) Plan provides guidance on the prevention/control of, emergency response to, and remediation of oil spills at the Greene County Highway Department Clifton Avenue Operations facility (Clifton facility). This plan provides a written explanation of Greene County's compliance with the requirements of federal Clean Water Act regulations found at 40 CFR Part 112. It specifies the equipment, personnel, procedures, and steps to prevent, control and provide adequate countermeasures to an oil spill.

The format of this SPCC Plan follows the specified sequence presented in 40 CFR 112.7(a)(3). The regulatory citation immediately follows each section heading and each section includes a discussion of the facility's conformance with the requirements of the referenced citation.

The Oil Pollution Act also requires facilities that "could reasonably be expected to cause substantial harm to the environment by discharging into or on navigable waters" to prepare a facility specific response plan which greatly expands emergency response requirements and activities. Greene County has determined (using published federal guidelines) that the Clifton facility does not meet the criteria of a facility that poses substantial harm. Certification of this determination is included in Appendix G.

2.0 FACILITY DESCRIPTION -112.7(a)(3)

2.1 Facility Operations

Greene County's Clifton Avenue Operations facility located at 2065 North Clifton supports all road maintenance activities for unincorporated Greene County. The facility is comprised of two vehicle maintenance shops, materials and vehicle maintenance parts warehouse, sign shop, equipment storage sheds, and administrative offices. The majority of the facility is paved. The facility diagram in Figure 1 denotes the various oil storage locations. Table 1 lists oil storage locations and respective quantities.

The responsibility for implementation of this SPCC plan lies with the Greene County Highway Department.

2.2 Facility Oil Storage -112.7(a)(3)(i)

Bulk oil is stored at the Clifton facility for maintenance of fleet vehicles. Tables 1 and 2 detail the type, quantity, location, and storage containers for the oil storage areas which are depicted on the facility diagram (Figure 1).

Table 2: Bulk Oil Storage Units

Location	Oil Type	Capacity (gal.)	Container Type
North Shop	Shell 15w40 T3 (diesel engine oil)	125	steel roller tote
North Shop	Shell Spirax S4 (donax TDH hydraulic fluid)	125	steel roller tote
North Shop	Shell Spirax S4 (donax TDH hydraulic fluid)	250	steel tank
North Shop	Shell 5w30 Motor Oil	250	steel tank
North Shop	Shell 5w20 formula motor oil	55	steel drum
North Shop	Citgo ATF +4 Transmission Fluid	55	steel drum
North Shop	Citgo AW 46 Hydraulic Oil	55	steel drum
North Shop	Autran SYN 295 Transmission Fluid	55	steel drum
North Shop	Caterpillar Transmission Fluid (x3)	165	55 gal. steel drums
North Shop	Transmission Fluid (x3)	165	55 gal. steel drums
North Shop	10w30 Motor Oil	55	steel drum
North Shop	JCB Transmission Fluid	55	steel drum
North Shop	Automatic Transmission Fluid (x2)	110	55 gal. steel drums
West of North Shop	Used Oil	1,000	double walled steel tank
South Shop	Shell Spirax S4 (donax TDH hydraulic fluid)	125	steel roller tote
South Shop	Shell 5w20 formula motor oil	125	steel roller tote
South Shop	Shell 15w40 T3 (diesel engine oil)	55	steel drum
See Figure 1	Unleaded Gasoline	6,000	UST
See Figure 1	Unleaded Gasoline	20,000	UST
See Figure 1	Diesel Fuel	20,000	UST
See Figure 1	Diesel Fuel	20,000	UST
See Figure 1	Diesel Fuel	366	Cummins Generator
See Figure 1	Diesel Fuel	308	Cummins Generator
See Figure 1	Diesel Fuel	500	Cummins Generator
See Figure 1	Diesel Fuel	112	Cat. Generator
Total Above Ground Capacity		4,111	
Total Completely Buried Capacity		66,000	
Total Facility Capacity		70,111	

2.2.1. Bulk Oil Storage Containers

North Shop

The north shop is the service bay for drivetrain and chassis maintenance activities on heavy vehicles. The shop replaces transmission fluid, hydraulic fluid, and engine oil for the fleet of dump trucks. The oil storage containers and capacities are detailed on Table 2 above. The oil stored in the shop is contained mostly in 55 gallon steel drums. The larger containers have hose connections that allow hydraulic fluid or transmission fluid to be pumped directly into the vehicle being serviced. The shop is completely enclosed and covered for protection from exposure to rainfall. The shop has an approximately 3' x 4.5' x 30 (405 cubic feet/3,029 gallons) sump in the floor for maintenance personnel. The steel-lined oil sump is directly plumbed into the 1,000 gallon steel holding tank. An air operated, double diaphragm pump in the holding tank pumps the oil directly from the heavy equipment bay to the 1,000 gallon waste oil tank.

South Shop

The south shop provides general maintenance for all vehicles in the county fleet. The shop changes oil on smaller passenger vehicles and conducts all other repairs on mechanical or electrical systems. Bulk oil containers are detailed in Table 2.

Used Oil Tank

Used oil is pumped from the north and south shops into a 1,000 gallon double-walled used oil tank manufactured by Agape Waste Oil Systems of San Diego, CA. The 1,000 gallon double-walled tank is located on the west side of the North Shop (see Figure 1). Used oil from vehicles is funneled into steel roller containers built specifically for the purpose of collecting used oil. Once full, the inflow valve is closed and a hose from the container drum is connected to the 1,000 gallon steel tank. The drum can then be pressurized with compressed air to pump the used oil into the 1,000 gallon holding tank. Used oil is collected by Heritage-Crystal Clean for recycling, usually once per month. Heritage-Crystal Clean is called when the used oil tank reaches 1/2-3/4 full (500-750 gallons)

Emergency Generators

Four (4) emergency generators are located at the Clifton Facility to provide back-up electrical power. See Figure 1 for locations of each generator. A Cummins DSHAC generator is located north of Building B and has a double walled fuel tank capacity of 366 gallons of diesel fuel. A Cummins DSGAA generator with a double-walled diesel fuel tank capacity of 308 gallons serves the administrative building. The North Shop, South Shop, and warehouse have a Cummins DQHAA generator with a double walled fuel tank capacity of 500 gallons of diesel fuel. Each of the Cummins generators are run on a weekly basis for approximately 20 minutes for emergency preparedness testing. The

Sign Shop is served by a Caterpillar D60-4 generator with a single-walled diesel tank capacity of 112 gallons.

Underground Storage Tanks

Two (2) 20,000-gallon underground fuel storage tanks containing diesel fuel are located in the central portion of the facility. Two (2) underground storage tanks contain unleaded gasoline. One (1) 20,000 gallon tank and one (1) 6,000 gallon tank combine for 26,000 gallons of underground unleaded gasoline storage capacity. See Figure 1 for the location of the four UST's. The underground storage tanks and piping are regulated by the UST regulations found at 40 CFR Part 268 and thus not subject to SPCC regulation. However, as further discussed in Section 3.6, the transfer of fuel to the tanks is regulated under the general secondary containment requirements found at 40 CFR 112.7(c).

2.3 Drainage Pathways

The Clifton facility is located within the Spring Branch watershed. The Spring Branch flows into the Little Sac River, then to Stockton Lake, and eventually to the Missouri River via Truman Lake and the Osage River. The Clifton facility is located only 300 feet from the watershed divide between the Missouri and Mississippi River basins. All runoff south of the Burlington Northern Railroad line flows into the Wilson's Creek watershed and then to the James River and on to the Mississippi through the White River system. Since the facility is so high in the watershed there is relatively little run-on to the site. The runoff from the site is generated almost entirely from the site itself.

Stormwater flow is predominantly from south to north. The fuel pump island is on a high point in the facility which breaks it into two sub-watersheds (see Figure 2). Runoff on the west side of the facility flows into a shallow detention basin on in the northwest corner. This basin discharges into a 30-inch reinforced concrete pipe which runs underneath W. High St. and discharges into an open channel that leads to Spring Branch. Runoff from the east side of the facility flows to a detention basin on the northeast corner of the property which discharges through an 18-inch pipe into the same open channel that leads to Spring Branch. The containment and countermeasures within this document are intended to intercept any spilled oil before it reaches these two discharge pipes.

2.4 Spill Prediction -112.7(b)

When experience indicates a reasonable potential for equipment failure, this plan must provide a prediction of direction, rate of flow, and total quantity of oil potentially discharged from the Clifton facility as a result of major equipment failure. To date, there have been no oil discharges from the facility. Either a discharge during a delivery of fuel to the underground tanks or a rupture of the used oil tank, especially when raining, seem to be the most probable worst-case scenario(s) for a spill. Table 3 presents the potential discharge quantity from each potential source.

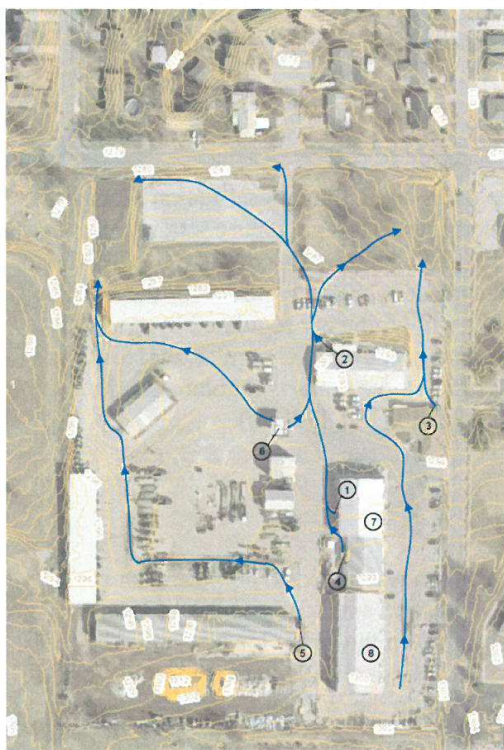


Table 3: Discharge Potential

Key	Bulk Container Type	Potential Discharge Scenario	Max. Potential Discharge Volume (Gallons)
1	Double Walled Steel Tank	Transfer to Collection Tanker	1000
2	Cummins DSHA/C Generator	Overfilling/ Tank Weld Failure	366
3	Cummins DSGAA Generator	Overfilling/ Tank Weld Failure	308
4	Cummins DGHAA Generator	Overfilling/ Tank Weld Failure	500
5	Caterpillar D60-4 Generator	Overfilling/ Tank Weld Failure	112
6	Fuel Island	Transfer to vehicles	N.A.
7	North Shop	Faulty Hose connection	250
8	South Shop	Faulty Hose connection	125



Figure 2: Facility Drainage Paths

3.0 DISCHARGE PREVENTION MEASURES -112.7(a)(3)(ii)

This section presents those measures that have been and will be taken to prevent the discharge of oil to navigable waters as defined in 40 CFR 112.1. Discharge prevention measures are comprised of operational procedures/practices and structural type controls (e.g., secondary containment structures). For clarification, any activity performed to prevent the discharge of oil to navigable waters once oil has released from containers/equipment is not a discharge prevention measure, but a discharge countermeasure as discussed in Section 4. In this Section the following topics are discussed:

- Drainage Control Diversionary Structures and Containment
- Bulk Storage Tanks/Secondary Containment
- Maintenance/Inspections/Recordkeeping
- Site Security
- Personnel Training
- Facility Tank Car and Truck Loading/Unloading Operations
- Facility Transfer Operations

3.1 Drainage Control, Diversionary Structures, and Containment

With the exception of the 1,000 gallon waste oil tank, and generator fuel tanks, all above-ground petroleum product storage is indoors at the Clifton Facility. Should an oil product be released, the site drainage will direct the spilled oil to one of two small detention basins (at the northwest and northeast corners of the facility). These basins can contain petroleum products spilled during dry weather, but would be inadequate should a spill occur during wet weather. For purposes of this SPCC document we do not consider the detention basins to qualify as secondary containment. Greene County does not have any qualified oil-filled operational equipment as defined in 40 CFR 112.2 stored at the Clifton Facility.

3.2 Bulk Storage Tanks/Secondary Containment -112.7(d)

This section describes this plan's conformance with the requirements found in 112.7(d) and 112.8(c) that are specific to bulk storage containers. Each of the following requirements are addressed in turn:

- Container materials must be compatible with the material stored -112.8(c)(1)
- Adequate secondary containment volume -112.8(c)(2)
- Prevent uncontrolled discharges of storm water from diked areas -112.8(c)(3)
- Protect buried metallic USTs from corrosion and regularly leak test -112.8(c)(4)
- Corrosion protection for partially buried or bunkered tanks -112.8(c)(5)
- Integrity testing on regular schedule and when material repairs made -112.7(c)(6)
- Monitor for leakage through internal heating coils -112.8(c)(7)
- Equip containers with overfill prevention device -112.8(c)(8)
- Observe effluent treatment facilities frequently enough to detect possible system upsets that could cause a discharge -112.8(c)(9)
- Promptly correct visible discharges -112.8(c)(10)
- Equip mobile or portable containers with secondary containment -112.8(c)(11)

As discussed in Section 2.1, Greene County Highway Department personnel operate and maintain the various bulk oil storage tanks and ancillary equipment at the Clifton facility. It is the responsibility of the Safety Officer to ensure that the tanks and ancillary equipment conform to local ordinances and applicable fire codes which may include but are not limited to, the National Fire Protection Association (NFPA) and International Fire Code Institute (IFCI) standards.

3.2.1 Material Compatibility -112.8(c)(1)

Table 4 presents construction information for the bulk storage containers, piping, valves, fittings, etc. at the Clifton facility.

Table 4: Bulk Oil Storage Construction Details

Location	Capacity (gal.)	Construction Type	Plumbing	Liquid Level Indicator	Manufacture date
North Shop	125	steel roller tote	Threaded steel and flexible hose	Glass float gage	Unknown
North Shop	125	steel roller tote	Threaded steel and flexible hose	Glass float gage	Unknown
North Shop	250	steel tank	Threaded steel and flexible hose	Glass float gage	Unknown
North Shop	250	steel tank	Threaded steel and flexible hose	Glass float gage	March, 2003
West of North Shop	1,000	double walled steel tank	Threaded Steel	Glass float gage	Unknown
South Shop	125	steel roller tote	Threaded steel and flexible hose	Glass float gage	Unknown
South Shop	125	steel roller tote	Threaded steel and flexible hose	Glass float gage	Unknown
See Figure 1	366	Cummins Generator	Threaded Steel	Dial gage	November, 2009
See Figure 1	308	Cummins Generator	Threaded Steel	Dial gage	November, 2010
See Figure 1	500	Cummins Generator	Threaded Steel	Dial gage	September, 2009
See Figure 1	112	Cat. Generator	Threaded Steel	Dial gage	Unknown

3.2.2 Secondary Containment -112.8(c)(2)*North and South Shops*

Because the bulk storage tanks in the north and south vehicle repair shops are all stored indoors, exposure to precipitation is not an issue. Current practice is to have enough booms and absorbent materials on hand to qualify as secondary containment as defined under 40 CFR 112.7 (c)(1). Greene County is in the process of purchasing commercially available polyethylene spill pallets and manufacturing custom containment units to further decrease the likelihood of an uncontrolled spill.

Waste Oil Storage Tank

The 1,000 gallon waste oil storage tank is a double walled tank providing secondary containment.

Diesel Powered Emergency Electric Generators

All the Cummins built generators are equipped with double walled fuel tanks in the base of the unit. The Caterpillar D60-4 has a single walled tank, but enough absorbent booms are kept on hand to contain the 112 gallon capacity of the generator tank.

3.2.3 Diked Area Drainage Controls -112.8(c)(3)

Greene County does not have any diked areas that qualify as secondary containment under CFR 112.8 (c)(3).

3.2.4 Buried Metallic Underground Storage Tanks -112.8(c)(4)

As shown on Figure 1 and described in Table 1, there are two 20,000-gallon steel underground storage tanks (UST) for diesel fuel in addition to a 20,000-gallon and a 6,000-gallon steel underground storage tank for unleaded fuel at the Clifton facility. These tanks are registered with and regulated by the Missouri Department of Natural Resources and as such, are exempt from SPCC regulation.

3.2.5 Corrosion Protection for Partially Buried or Bunkered Tanks -112.8(c)(5)

There are no partially buried or bunkered tanks at the Clifton facility, therefore, the requirements found at 40 CFR 112.8(c)(5) do not apply.

3.2.6 Integrity Testing -112.8(c)(6)

Bulk storage containers must be tested for integrity on a regular basis. “Integrity testing” is any means to measure the strength (structural soundness) of the container shell, bottom, and/or floor to contain oil and may include leak testing to determine whether the container will discharge oil. It includes, but is not limited to, testing foundations and supports of containers. Its scope includes both the inside and outside of the container. It also includes frequent observation of the outside of the container for signs of deterioration, leaks, or accumulation of oil inside diked areas.

EPA suggests following industry standards for integrity testing when applicable. The Steel Tank Institute (STI) Standard SP001, “Standard for Inspection of Aboveground Storage Tanks” is an industry standard that is referenced in the regulations and widely used by the regulated community. The periodic inspection requirements included in Section 3.3 are based on the inspection guidance included in STI Standard SP001.

Under the STI Standard SP001 (2011 revision) the Clifton tanks are considered “Category 1” tanks because they are elevated (i.e. raised above the ground surface) and they are equipped with secondary containment. Further, because all the tanks have capacities less than 5,000 gallons, they are only subject to periodic (monthly and annual) inspections. Personnel performing the inspections need not be certified, but they shall be knowledgeable about storage facility operations, the type of aboveground storage tank

(AST) and its associated components, and characteristics of the liquid stored. The inspector must also be familiar with pumping, piping and valve operations of the AST system.

1,000-Gallon Waste Oil Tank

Pressure testing is performed on the Waste Oil tank on an annual basis by pressurizing the interstitial space between the inner and outer tank walls to 3 pounds per square inch (PSI). This pressure must be held for at least one hour to verify the integrity of the tank walls. For all other ASTs, visual external inspections described in Section 3.3. are deemed sufficient for determining tank integrity.

3.2.7 Internal Heating Coils Leakage Monitoring -112.8(c)(7)

None of the bulk containers at Clifton are equipped with internal heating coils therefore the requirements found at 112.7(c)(7) do not apply.

3.2.8 Overfill Prevention -112.8(c)(8)

All storage tanks in the north and south shop greater than 55-gallons are equipped with float gauges to monitor liquid level. The 1,000-gallon waste oil tank and all generator fuel tanks are likewise equipped with float gauges on the top of the tanks. Highway Department personnel either perform, or are present to monitor the filling of all bulk containers.

3.2.9 Effluent Treatment Facility Inspections -112.8(c)(9)

This section applies to treatment facilities installed for the express purpose of treating oil-contaminated waters prior to discharge. This section is not applicable because there is no such treatment facility at the Clifton facility.

3.2.10 Visible Discharge Corrections -112.8(c)(10)

As specified in Section 4 of this plan, all visible discharges from containers will be promptly corrected.

3.2.11 Mobile and Portable Containers -112.8(c)(11)

The Clifton facility operates only one mobile refueler (as defined in 112.2) which is not required to have secondary storage capacity. Visual inspections are performed monthly to detect any possible leaks from the storage tank.

3.3 Inspections, Maintenance and Records -112.7(e)

Greene County Highway Department personnel conduct inspections and tests and maintain equipment/containers as specified below. Written procedures and records of inspections and tests, signed by the appropriate supervisor or inspector, will be kept for a period of at least three years.

3.3.1 Inspections

Greene County Highway Department personnel formally inspect all oil storage equipment and containers on a monthly basis or at the frequencies described below. Unusual circumstances or conditions (signs of deterioration, leaks, oil seepage, etc.) should be reported immediately to the Safety Officer or Operations Director. All monthly inspection findings are documented on the inspection log/checklist included in Appendix A.

Bulk Tanks in the North and South Shop areas

Monthly inspection items include:

- Visible signs of leakage from tank and components
 - Inspect tank shell, valves, and fittings for corroded or abraded areas, dents, distortions, defects in welds, and any other conditions, including leakage.
 - Inspect piping, valves, and gaskets for corroded areas, defects in welds, and other conditions, including leakage.
- Tank vents
 - Vents must be clear and unobstructed
- Bolts
 - Missing bolts, nuts, and fusible links or elements must be replaced, and loose bolts and nuts must be tightened.
- Liquid level floats
 - Ensure float is not stuck
- Secondary containment
 - Check containers for cracks, defects and cleanliness
- Spill response materials
 - Check spill kits and warehouse for adequate absorbent materials (see Appendix B) on hand

Mobile Refueling Tanker Truck

Greene County Highway Department personnel will inspect the double-walled tanker truck annually and ensure that documentation of the inspection is maintained. The following inspection items are taken from 49 CFR 180.407(d), applicable to visual inspection of specification cargo tanks. DOT certification of the inspector is not required. The external visual inspection will include as a minimum the following:

1. Inspect the tank shell and heads for corroded or abraded areas, dents, distortions, defects in welds, and any other conditions, including leakage, that might render the tank unsafe for transportation services.
2. Inspect piping, valves, and gaskets for corroded areas, defects in welds, and other conditions, including leakage that might render the tank unsafe for transportation service.
3. All devices for tightening manhole covers must be operative and there must be no evidence of leakage at manhole covers or gaskets.
4. All emergency devices and valves including self-closing stop valves, excess flow valves, and remote closure devices must be free from corrosion, distortion, erosion and any external damage that will prevent safe operation.
5. Missing bolts, nuts, and fusible links or elements must be replaced, and loose bolts and nuts must be tightened.
6. All major appurtenances and structural attachments on the cargo tank including, but not limited to, suspension system attachments, and connecting structures must be inspected for any corrosion damage which might prevent safe operation.

Oil-Drum Storage in North and South Shop Building

Monthly (Record on Log Sheet, Appendix A):

Check condition of drums, bungs, and labels

Check condition of secondary containments systems

Check for proper arrangement of drums. Stacking barrels directly on top of each other is not allowed. Special racks have been fabricated for the vertical utilization of available space.

3.3.2 Tests/Maintenance

Periodic tests and preventive maintenance are integral components of spill prevention. Highway Department personnel test oil-storing equipment and containers according to applicable industry standards or manufacturers recommendations.

Annually, pressure testing is performed on the Waste Oil tank by pressurizing the interstitial space between the inner and outer tank walls to 3 pounds per square inch (PSI). This pressure must be held for at least one hour to verify the integrity of the tank walls. For all other ASTs, visual external inspections described in Section 3.3. are deemed sufficient for determining tank integrity.

3.3.3 Records

Maintenance of records required by this SPCC Plan is the direct responsibility of the Safety Officer and Environmental Compliance Manager. All records, reports, inspections, checklists, etc. specified in this SPCC Plan are to be kept on file and readily available for at least a period of three years. Records of inspections, testing, and maintenance activities required by this plan may be kept by using record keeping systems already in place.

3.4 Personnel, Training, and Discharge Prevention Procedures -112.7(f)

The Greene County Highway Department is responsible for properly instructing personnel in the operation and maintenance of equipment to prevent the discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and the contents of the SPCC Plan.

The Safety Officer, in conjunction with the Environmental Compliance Manager, are responsible for ensuring that spill prevention briefings are conducted for their respective operating personnel at intervals frequent enough (at least once per year) to assure adequate understanding of this SPCC Plan. Such briefings highlight and describe known spill events or failures, malfunctioning components, and recently developed precautionary measures.

3.5 Security -112.7(g)

The Clifton facility is totally enclosed by fencing (kept in good repair). Access gates close after normal business hours (6 pm). The facility is adequately lighted at night for all nighttime operations conducted at the site, including discovery of discharges. Lighting, along with regular visits by sheriff's patrol vehicles is adequate to deter acts of vandalism.

3.6 Facility Tank Car and Tank Truck Loading/Unloading Rack -112.7(h)

The requirements found at 40 CFR 112.7(h) do not apply to the Clifton facility because there are no loading/unloading racks at the facility. However, the oil and fuel transfers described below are subject to the general secondary containment requirements found at 40 CFR 112.7(c).

Underground Fuel Storage Tanks

Secondary containment for releases of fuel is provided by the retention areas northeast and northwest of the underground fuel tanks (See Figure 2), as well as absorbent booms available to be deployed in the event of a product release.

Each of the four underground storage tanks are equipped with overfill and spill prevention devices as required by federal and state regulations. The overfill prevention

devices are intended to shut off the delivery of fuel to the tanks once they reach 95 percent capacity. Overfilling of the tanks should be prevented as long as the delivery truck driver makes the proper connections to the fill pipe.

Highway Department Warehouse personnel are responsible for scheduling and oversight of fuel deliveries. Prior to a delivery, warehouse personnel will determine the amount of fuel in the tank via the daily tank monitoring printout from the Franklin EVO leak monitoring system. The printout volume is entered into the Franklin Fueling System, online ordering database daily. The fuel use by each county vehicle is also monitored and automatically totaled as a secondary verification of the volume of the tank available to accept delivery. These checks are added protection against overfilling of the tanks.

Typically most releases that occur during fueling of vehicles are the result of human error (i.e., inattentiveness) resulting in the overfilling of a vehicle's fuel tank. All Greene County personnel that perform vehicle fueling should closely monitor the operation until it is complete. Emergency shutoff valves are located on the fuel pump island.

3.7 Facility Transfer Operations -112.8(d)

This section is not applicable to the Clifton facility as there are no facility transfer operations conducted. There are no above or below grade pipelines at Clifton used for oil transfer.

4.0 DISCHARGE COUNTERMEASURES -112.7(a)(3)(iv-vi)

This section, also known as the Oil Spill Contingency Plan (OSCP), presents the countermeasures that Greene County personnel (and/or response contractor) must take in the event of an oil release. Discovery, response and cleanup actions are included. In accordance with 112.7(a)(5), this portion of the Plan is organized in a way that will make procedures readily usable in an emergency. Supporting materials are included as appendices. The basic components of the OSCP are:

- Spill Notification
- Immediate Response Activities
- Cleanup Activities
- Waste Disposal

It is not anticipated that an oil spill at the Clifton facility will require the assistance of an emergency response contractor. The Greene County warehouse facility maintains adequate spill response supplies/equipment (See Appendix B). It is the responsibility of the Safety Officer, Environmental Compliance Manager, or the Spill Response Coordinator to determine if outside assistance is required. Appendix C provides a listing of spill response contractors that could be procured if the need arises.

4.1 Notifications/Emergency Contacts

This section provides the emergency notification requirements in the event of an oil release. Notification must first be given internally to appropriate Greene County personnel and then externally to regulatory and other local governmental agencies. Any number of personnel may detect the release; therefore, it is essential that all employees be aware of this plan and understand they have a responsibility to report the release immediately.

4.1.1 Internal Notification

In all probability, a leak or spill will be detected by facility personnel during routine operations at the site. It is the responsibility of the employee who has discovered the leak to immediately notify their supervisor. The supervisor shall notify the Safety Officer who will in turn notify the Environmental Compliance Manager. The Environmental Compliance Manager will assume the role of Spill Response Coordinator (SRC). In the event the Environmental Compliance Manager is unavailable, the Safety Officer will be the designated SRC. The Safety Officer can be reached by calling 860-7707 or by calling the Environmental Compliance Manager at 834-3015. Names/phone numbers of those to be contacted are provided in Appendix D.

4.1.2 Notification of Regulatory Agencies

The SRC is responsible for ascertaining whether a particular spill event is reportable (based on information known to him/her) and for actually notifying the appropriate government agency. In ascertaining whether (and to whom) a spill is reportable, the SRC should use the following guidelines.

1. If the oil has the potential to reach navigable waters (creeks, streams, rivers, lakes) in sufficient quantity to cause visible sheen or bottom sludge, notify the National Response Center at 1-800-424-8802.
2. If an oil spill is in excess of 50 gallons, notify Missouri Department of Natural Resources (MDNR) by calling 573-634-2436. This is the MDNR Emergency Response Center, and the phone is manned 24 hours per day. Also call the Local Emergency Planning Commission (LEPC) by calling 417-869-6040.
3. If both conditions apply, notify both agencies.

The SRC shall be prepared to report the following information to the regulatory agency contacted:

1. Exact address and phone number of facility
2. Spill date and time
3. Type of material spilled
4. Estimates of total quantity spilled
5. Estimates of total quantity spilled into navigable water
6. Source of the spill
7. Description of affected medium
8. Cause of the spill
9. Damages or injuries caused by spill
10. Actions being used to mitigate effects of discharge
11. Whether an evacuation may be needed
12. Individuals/organizations who have been contacted

4.1.3 City and Fire Department Notification

It is the responsibility of the Safety Officer or Environmental Compliance Manager to notify the appropriate City agencies. Under the conditions described below, the Northwest Wastewater Treatment Plant and/or the Springfield Fire Department should be contacted.

If the potential exists or if oil has been discharged into the Springfield sanitary sewer system, immediate notification should be given to Bruce Hinkston, Plant Superintendent of the Northwest Clean Water Plant by calling 417-833-0697. If no one is available, call the Southwest Clean Water Plant at 417-891-1900. This number is staffed 24 hours per day. Additionally, the City of Springfield industrial pretreatment program should be notified by telephone at 864-1923 from the hours of 8:00 a.m. to 4:30 p.m.

While there is no requirement to notify the fire department in the event of an oil spill, they do have personnel and equipment to assist in the containment and cleanup activities, which could prove to be especially useful after normal working hours. If the spill is serious enough to be deemed an emergency and/or additional manpower is required, the fire department should be contacted by calling 864-1550 or 911. Large spills will be handled by the fire department's hazardous materials (HAZMAT) team.

4.2 Immediate Response Activities

Immediate response activities are performed from the time of spill detection (or if a release is suspected) to the time the leak is stopped (if possible) and the spill contained. Highway Department personnel are responsible for implementing immediate responses necessary to preclude entry of oil into the storm drains including the deployment of absorbent material, absorbent booms, containment berm construction, and diversions. The Safety Officer is in charge of implementing spill containment procedures. The Spill Response Coordinator will work with the Safety Officer by providing oversight and

guidance during the response activities. If required, the immediate services of a spill response contractor (see Appendix C) should be obtained.

To the extent practicable, all oil spills must be precluded from entering the storm water drainage system. Even small spills have the potential to trigger state, federal and local reporting requirements, and monetary penalties.

The outlet structures on the northwest and northeast detention basins (See Figure 2) are the last on-site point of the storm water drainage system depending on the location of the spill. An oil release which causes a visible sheen or bottom sludge in the storm water beyond this point is reportable, therefore a concerted effort should be made to prevent oil releases from migrating beyond this point.

The following sections present immediate response actions specific to the various oil storage locations at the site. These response actions are presented only to provide general guidance. At the discretion of the Safety Officer, or Environmental Compliance Manager, and depending on the specifics of the release, it may be necessary to perform additional or alternate actions.

North and South Shop Buildings

The location of a release within the North or South Shop Buildings will determine which part of the stormwater drainage system might be impacted. Since all oil is stored inside the buildings, any spill is most likely to be contained within the building and not impact the stormwater system at all. In the event of a spill any open doors will immediately be closed to contain the spill as much as possible. Any oil that escapes the building and is released on the east side of the buildings has the potential to flow north to the detention basin in the northeast corner of the facility (see Figure 2). Oil escaping the building on the west side will have the potential to migrate north to the detention area on the northwest or northeast side of the facility depending on if the flow splits or not. Immediate response actions should include:

- Immediately close all outer doors and line the door sill with absorbent booms to prevent escape of oil outside the building
- If possible, stop leakage from containers or equipment. If leakage cannot be stopped, investigate the potential of diverting release into temporary containment structure or pans, or into the sump in the north shop.
- Deploy absorbent mats, pillows, and/or booms perpendicular to the flow path in Figure 2 to intercept oil before it reaches the detention basin if oil has escaped the building.
- If oil has entered the detention basin(s), deploy booms at the inlet box on the southwest corner of N. Clifton and W. High Streets and/or the outlet pipes for the northwest detention basin.
- If oil has been discharged from the basin, also deploy booms in the concrete drainage channel north of W. High St. Permission will need to be obtained from

the owner of 2651 W. High St. or 2215 N. Ethyl Pl. to gain access to the drainage channel for boom deployment.

Waste Oil Tank

In the unlikely event of a breach in both walls of the used oil tank, oil will flow north and likely split between the northwest and northeast basins and some may flow directly into W. High St. if not immediately contained.

Immediate response actions should include:

- Deploy sandbags across the open side of the waste oil tank enclosure to contain oil in a confined area. For releases inside sand bag diked area, collect oil using standard absorbent materials or by transferring oil to drums. Spill supplies are located in the warehouse.
- Deploy absorbent mats, pillows, and/or booms perpendicular to the flow path in Figure 2 to intercept oil before it reaches the detention basin.
- If oil has entered the detention basin(s), deploy booms at the inlet box on the southwest corner of N. Clifton and W. High Streets and/or the outlet pipes for the northwest detention basin.
- If oil has been discharged from the basin, also deploy booms in the concrete drainage channel north of W. High St. Permission will need to be obtained from the owner of 2651 W. High St. or 2215 N. Ethyl Pl. to gain access to the drainage channel for boom deployment.

Underground Fuel Storage Tanks

Releases in the immediate area of the underground tanks have the potential to enter the northwest detention area. Releases at the fuel dispensers have the potential to flow to the northeast basin, northwest basin, or to W. High St. Immediate response activities include:

- Deploy absorbent mats, pillows, and/or booms perpendicular to the flow path in Figure 2 to intercept oil before it reaches the detention basin.
- Protect basin outlet by use of absorbent mats, pillows or booms.
- If oil has been discharged from the basin, also deploy booms in the concrete drainage channel north of W. High St. Permission will need to be obtained from the owner of 2651 W. High St. or 2215 N. Ethyl Pl. to gain access to the drainage channel for boom deployment.

4.3 Cleanup Activities

Cleanup activities begin immediately following spill containment and conclude with full site remediation.

Cleanup objectives include:

- Removal of free product
- Removal of contaminated materials
- Removal of oil from storm drainage system and waterways

Expedite cleanup activities to minimize adverse environmental impacts caused by the release. Attempt to recover as much free product as possible thus minimizing the amount of infiltration of the oil into underlying soils. Oil can impair (soften) an asphalt surface if left in contact with it too long. Clean storm drainage systems thoroughly to prevent further migration of oil during subsequent rainfall events. A listing of equipment and supplies to utilize in the cleanup activities that are available at the Clifton facility can be found in Appendix B. Other equipment needed may be available from local equipment rental companies.

4.3.1 Removal of Free Product

Although not likely, removal of oil as a liquid may be required as part of cleanup efforts at the Clifton facility. Oil requiring removal may be in secondary containment units, diked areas, storm water drains, or atop water. Reuse of the oil (as opposed to treating as a waste) is a goal to keep in mind when selecting the method of removal/collection. Attempts should be made to minimize the amount of debris/water recovered with the oil.

For small volumes of oil recovered, closed-top, 55-gallon drums can be used to contain the recovered oil. Larger volumes may require obtaining a tanker for storage of the oil. Appendix C provides a listing of those companies that can supply tankers. Additionally, vacuum truck services are available from a few of the contractors identified.

Close attention should be paid to the filling operations to minimize any spillage that may occur. Oil absorbent booms and granules should be available to cleanup minor spills. This material should be immediately placed in open-top, 55-gallon drums or other suitable containers.

4.3.2 Removal of Contaminated Material

The Safety Officer, in cooperation with the Environmental Compliance Manager will determine the magnitude of the cleanup activities governed by current regulations. Remediation may involve the excavation of soils either manually or with the use of heavy equipment. Develop waste type and quantity estimates for obtaining proper disposal approvals (discussed in Section 4.4). Waste characterization sampling may be required. The SRC may coordinate water and/or soil sampling with an environmental contractor to verify that applicable cleanup standards have been met.

Oil contaminated materials (i.e., excavated soils, absorbent materials, etc.) should, depending on the volume generated, be either contained in drums or placed directly into plastic lined dump trucks. Avoid stockpiling of materials to minimize handling of the material. Storm water runoff from stockpiled materials could cause additional contamination. If stockpiling cannot be avoided, the area should first be lined with heavy visqueen and bermed around the edges. Once material has been deposited on the plastic, it should be covered with heavy visqueen and secured with sandbags or their equivalent.

Ensure that materials destined for disposal as solid waste are void of free liquids. If necessary, place drier soil and/or absorbent material into the drums/trucks to soak up any free liquids that may drain from saturated materials. If possible, mix the materials in the drums or truck to alleviate this situation. To preclude rainfall, dump trucks shall be immediately covered or parked under a roofed area after being filled. Dump trucks containing contaminated materials shall not be left uncovered overnight.

4.3.3 Removal of Oil from the Storm Water Drainage System and Waterways

Releasing oil into a waterway, defined as the open channels that receive discharge water from the two detention basins, in sufficient amounts to cause a visible sheen or bottom sludge is a violation of state and federal water quality standards. Remediation is not complete until all visible indications of oil have been removed. Oil booms can be used to contain oil on water surfaces. Small areas can be soaked up using oil absorbent mats. Large surface areas may require using an oil skimmer. Oil released into "dry" storm water drains should be removed so as to prevent the further migration and contamination of waterways. Monitor future storm water discharges for signs of oil.

4.4 Waste Disposal

Dispose of all oil-contaminated material in accordance with federal, state, and local regulations. Anticipated waste streams generated from the cleanup of an oil spill are pure oil, water contaminated oil, oily water, and oil contaminated solids (e.g., soils, gravel, absorbent materials, personal protective equipment) that do not contain free liquids. Oil which, after recovery, can no longer be used as originally intended will be disposed of as used oil under all current and applicable regulations.

Oil contaminated solids (i.e., soils, absorbent materials, clothing, etc.) which do not contain any free liquids will be disposed of at the Springfield Sanitary Landfill under special approval from the City's Solid Waste Division. The Environmental Division of the Resource Management Department is responsible for obtaining the necessary approvals from the City. A DNR Special Waste Disposal Request may be required to be submitted to the City (See Appendix F). This form can be obtained at <http://dnr.mo.gov/forms/780-1166-f.pdf>

4.5 Spill Reports

Submittal of a written follow-up report to Greene County's Environmental Division is the responsibility of the Safety Officer, or Environmental Compliance Manager involved in spill response activities. The Spill Report form shown in Appendix E must be used. If required, the Environmental Compliance Manager will submit written reports to regulatory agencies. A record of all spill reports shall be maintained with the SPCC Plan.

APPENDIX A
MONTHLY INSPECTION AND CORRECTIVE ACTION LOG

MONTHLY INSPECTION LOG CLIFTON OIL AND FUEL BULK STORAGE CONTAINERS

Inspection Date: _____
 Date of Previous Inspection: _____
 Inspector's Signature: _____

	Y	N	Comments
SOUTH SHOP			
125 Gal. Tote (Hydraulic Fluid)			
Floor is free of oil drips			
Hose connections are secure and clean			
Tank welds are in good condition			
125 Gal. Tote (5-W-20 Motor Oil)			
Floor is free of oil drips			
Hose connections are secure and clean			
Tank welds are in good condition			
55-Gallon Drums			
Spill pallets are in good condition			
No free oil in spill pallets			
Drums in good condition and properly arranged			
Adequate supplies in spill kit(s)			
NORTH SHOP			
55-Gallon Drums			
Spill pallets are in good condition			
No free oil in spill pallets			
Drums in good condition and properly arranged			
125 Gal. Tote (Hydraulic Fluid)			
Floor is free of oil drips			
Hose connections are secure and clean			
Tank welds are in good condition			
125 Gal. Tote (15-W-30 T3 Diesel Engine Oil)			
Floor is free of oil drips			
Hose connections are secure and clean			
Tank welds are in good condition			
250 Gal. Tank (15-W-30 T3 Diesel Engine Oil)			
Containment unit is in good condition			
Hose connections are secure and clean			
Tank welds are in good condition			
Sight glass is readable and showing no overfill			
250 Gal. Tank (Hydraulic Fluid)			
Containment unit is in good condition			
Hose connections are secure and clean			
Tank welds are in good condition			
Sight glass is readable and showing no overfill			
Adequate supplies in spill kit(s)			
1,000 Gal. Used Oil Tank			
Passes interstitial pressure test			
Ground is free of visible oil leaks			
Tank welds are in good condition			
Hose connections are secure and clean			
Vent is clean and unobstructed			
Sight glass is readable and showing no overfill			
EMERGENCY GENERATORS			
Generator #1 (Cummins, Building B)			
No visible diesel or oil leaks			
Generator #2 (Cummins, Administrative Building)			
No visible diesel or oil leaks			
Generator #3 (Cummins, Warehouse and Shops)			
No visible diesel or oil leaks			
Generator #4 (Caterpillar, Sign and Paint Shop)			
No visible diesel or oil leaks			

	Y	N	Comments
Fuel Dispensing Equipment			
Fuel Hoses			
Hose connections are secure with no visible leaks			
Hose walls are in good condition with no visible leaks			
Tank welds are in good condition			
Fuel Pump Mechanical Systems (Remove Panel to Inspect)			
Floor of pump housing is dry and drip free			
No visible leaks from pipes and connections			
Adequate supplies in spill kit(s)			
Mobile Refueling Truck			
Hose connections are secure with no visible leaks			
Flanges, gaskets, and bolts are tight			
Tank welds are in good condition			

CORRECTIVE ACTION LOG
CLIFTON OIL AND FUEL BULK STORAGE CONTAINERS

Date of Inspection Deficiency Noted: _____

Description of Deficiency: _____

Description of Corrective Action Needed: _____

Date Corrective Action Completed: _____

All inspection checklists and corrective action logs are to be kept on file for a period of no less than three years from the date of inspection.

APPENDIX B
SPILL RESPONSE SUPPLIES & EQUIPMENT

Material		Quantity	Location
2 Spill Kits	Absorbent Mat Roll	1 Each	South Shop
	Oil Absorbent Socks (5-inch diameter 10-foot length)	4 Each	South Shop
	55-Gallon Closed Top Drums	1 Each	South Shop
Oil Absorbent Socks (5-inch diameter, 10-foot length)		24	Warehouse
Absorbent Mat Roll		5	Warehouse
Granular Multi-Purpose Absorbent		1 Pallet (1,600 lbs.)	Warehouse
Spill Kit	Absorbent Mat	2 Sheets	Warehouse
	Oil Absorbent Socks (5-inch diameter 10-foot length)	1	Warehouse
	Absorbent Pillow (Large)	1	Warehouse
	Oil Absorbent Socks (3-foot length)	2	Warehouse
	Absorbent Pillow (Small)	1	Warehouse
	Oil Absorbent Granules	1 Package	Warehouse

APPENDIX C
REMEDATION CONTRACTORS

SPILL CLEAN UP CONTRACTORS	VACUUM TRUCK SERVICES
Sunbelt Environmental Services 621 N. Prince Lane Springfield, MO 65802 417-831-5052 831-6258 (fax) 1-800-333-5052 (24 hr. #)	Sunbelt Environmental Services 621 N. Prince Lane Springfield, MO 65802 417-831-5052 831-6258 (fax) 1-800-333-5052 (24 hr. #)
Environmental Works 1455 E. Chestnut Expressway Springfield, MO 65802 417-890-9500 417-823-9659 (fax) 877-827-9500 (24 hr. #)	Safety Kleen 734 N. West Bypass Springfield, MO 65802 417-869-1179
USED OIL RECYCLING	TANKER SUPPLIERS
	Rex Smith Oil Co. 2321 N. West Bypass Springfield, MO 65803 417-866-1960
Safety Kleen 734 N. West Bypass Springfield, MO 65802 417-869-1179	National Oil Co. 2345 W. Kearney Springfield, MO 65803 417-866-6622 1-800-678-6622 (24 hr. #)

APPENDIX D
INTERNAL NOTIFICATION CALL-OUT LIST

First call the on-call pager number. At any time the Highway Department supervisor who is on call can be reached by calling the duty pager number, 287-0098. If there is no response, call the Highway Department personnel in the order listed. The supervisor on duty will then call the Environmental Compliance Manager.

Greene County Highway Department

Jeff Deckard Safety Officer	Office: 829-6513 Cell: 860-7707
Harry Stennett Operations Director	Office: 829-6532 Cell: 838-1264
Jim Norgren Bridge/Culvert Maintenance Supervisor	Office: 829-6518 Cell: 300-2614
Joe Polo West Side Supervisor	Office: 829-6531 Cell: 838-7325
Kevin Bade East Side Supervisor	Office: 829-6042 Cell: 4549-8598
Andrew Nelson Projects Manager	Office: 829-6514 Cell: 234-4114
Adam Humphrey, P.E. Assistant Administrator	Office: 829-6536 Cell: 860-9148
Rick Artman Administrator	Office: 829-6505 Cell: 840-2402

Greene County Environmental Division

Tim Davis Environmental Compliance Manager	Office: 868-4122 Cell: 834-3015
---	------------------------------------

APPENDIX E
OIL SPILL REPORT FORM

OIL SPILL REPORT FORM

Date of Spill: _____

Cause of Spill: _____

Approximate Volume of Oil Spilled: _____ gallons

Was Spill Reported to Regulatory Agency? Yes____ No____

Describe Portion of Facility Affected: _____

Did Oil Reach Any Part of the Off-Site Stormwater System? Yes____ No____

Countermeasures Taken (Include Dates, Attach Separate Sheet if Necessary): _____

Follow-Up Monitoring or Countermeasures Needed: _____

Highway Department Contact Person: _____

Report Entered By: _____

Date of Report: _____

APPENDIX F SPECIAL WASTE DISPOSAL REQUEST



MISSOURI DEPARTMENT OF NATURAL RESOURCES
SOLID WASTE MANAGEMENT PROGRAM
SPECIAL WASTE DISPOSAL REQUEST

SECTION I GENERAL INFORMATION (TO BE COMPLETED BY THE GENERATOR AND LANDFILL OPERATOR)	
DISPOSAL FACILITY	WASTE GENERATOR
NAME	
ADDRESS	
CITY, STATE, ZIP CODE	
TELEPHONE NUMBER WITH AREA CODE	
PERMIT NO.	N/A
CONTACT PERSON	
SECTION II WASTE CHARACTERIZATION (TO BE COMPLETED BY THE GENERATOR)	
A. NAME OF WASTE	
B. DESCRIPTION OF GENERATION PROCESS	
C. (CHECK ONE)	
(1) ☐ SOLID (2) ☐ SLUDGE (20% OR GREATER SOLIDS) (3) ☐ SLURRY (20% OR LESS SOLIDS)	
(4) ☐ LIQUID (5% OR LESS SOLIDS) (5) ☐ OTHER - SPECIFY:	
(INDICATE) % SOLIDS BY WEIGHT:	
SPECIFIC GRAVITY:	PUMPABLE: ☐ YES ☐ NO, ODOR: ☐ YES ☐ NO FREE FLUID: ☐ YES ☐ NO
pH	FLASHPOINT
D. WAS THE WASTE EVER CLASSIFIED OR LISTED HAZARDOUS?	
☐ YES ☐ NO IF YES, SPECIFY THE EPA WASTE NUMBER:	
E. LIST BELOW THE CHEMICAL COMPOSITION (ATTACH ANY ADDITIONAL ANALYSIS)	
MAJOR COMPONENTS	% BY WEIGHT
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
F. SOURCE OF CHEMICAL DATA	
SECTION III GENERATION RATE/DISPOSAL FREQUENCY* (TO BE COMPLETED BY THE GENERATOR)	
A. AVERAGE GENERATION RATE (CUBIC YARDS PER WEEK, POUNDS PER MONTH, ETC.)	
B. DISPOSAL REQUEST [COMPLETE (1) OR (2)]	
(1) ☐ Continual (or intermittent)	
If disposal is to be made on a continual or intermittent basis, indicate the quantity and frequency of disposal _____ (cubic yards per week, pounds per month, etc.)	
Indicate the quantity available for immediate disposal, if applicable _____	
(2) ☐ One-time only	
If one-time only, indicate the total amount to be disposed of _____	
*NOTE: INDICATE APPROPRIATE UNITS (TONS, GALLONS, POUNDS, CUBIC YARDS, ETC.)	
SECTION IV TRANSPORTATION (TO BE COMPLETED BY GENERATOR OR LANDFILL OPERATOR)	
A. CONTAINERS USED FOR TRANSPORTATION (CHECK ONE)	B. TYPE OF VEHICLE
(1) ☐ BULK (_____ CUBIC YARDS)	(1) ☐ TRACTOR-TRAILER
(2) ☐ METAL DRUMS (_____ GALLONS)	(2) ☐ ROLL-OFF/LUGGER
(3) ☐ CASES, CARTONS (_____ SIZE)	(3) ☐ DUMP TRUCK
(4) ☐ FIBER DRUMS (_____ GALLONS)	(4) ☐ OTHER _____
(5) ☐ OTHER - SPECIFY _____	

MO 780-1166 (05-12)

Page 1 of 2

SECTION V DISPOSAL TECHNIQUES (TO BE COMPLETED BY LANDFILL OPERATOR)A. ☐ SEPARATE TRENCH BURIAL

(1) LOCATION ON LANDFILL SITE _____

(2) TRENCH DESIGN PREVIOUSLY APPROVED BY DNR? ☐ YES ☐ NO IF NOT, ATTACH REQUEST FOR APPROVALB. ☐ CO-DISPOSAL WITH MUNICIPAL WASTE ON ACTIVE FILL FACE

(1) AVERAGE DAILY QUANTITY OF MUNICIPAL SOLID WASTE _____ (SPECIFY TONS OR CUBIC YARDS)

(2) SPECIAL WASTE TO BE UNLOADED AT _____ TOP OF WORKING FACE
_____ TOE OF SLOPEC. ☐ OTHER DISPOSAL PROCEDURES - SPECIFY _____**SECTION VI HANDLING PROCEDURES (TO BE COMPLETED BY GENERATOR)**

Safety precautions during handling: Provide handling information supplied by product manufacturer, waste generator, or from other sources, describing the necessary measures that should be taken to protect personal safety, to control dusting, or to ensure fixed placement of waste. This should include a description of materials not compatible with this waste.

SECTION VII CERTIFICATION (TO BE COMPLETED BY GENERATOR AND LANDFILL OPERATOR)

I, the undersigned, submit this request to dispose of the named waste and certify that the information supplied herein is correct. I understand approval to dispose of the waste may be suspended if false information has been submitted or if the disposal operation is not performed in a proper and legal manner.

SIGNATURE OF LANDFILL OPERATOR OR AUTHORIZED REPRESENTATIVE _____

PRINT NAME/TITLE _____

DATE _____

I, the undersigned, submit this request to dispose of the named waste and certify that the waste named herein, to the best of my knowledge, is not a hazardous waste as defined by the Missouri Waste Management Law and rules, and that the information supplied herein is correct.

SIGNATURE OF WASTE GENERATOR OR AUTHORIZED REPRESENTATIVE _____

PRINT NAME/TITLE _____

DATE _____

ADDITIONAL COMMENT _____

MAIL THE COMPLETED FORM TO: PLEASE SEND TO THE REGIONAL OFFICE IN YOUR AREA.For address information visit: <http://dnr.mo.gov/regions/regions.htm>

APPENDIX G
CERTIFICATION OF THE APPLICABILITY OF THE
SUBSTANTIAL HARM CRITERIA CHECKLIST

FACILITY NAME: Greene County Highway Department
FACILITY ADDRESS: 2065 North Clifton Avenue
Springfield, Missouri 65803

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons:

YES ☐ NO ☒

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?

YES ☐ NO ☒

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the formula in Attachment C-III, Appendix C, 40 CFR 112) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?

YES ☐ NO ☒

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula (Attachment C-III, Appendix C, 40 CFR 112)) such that a discharge from the facility would shut down a public drinking water intake?

YES ☐ NO ☒

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?

YES ☐ NO ☒

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Timothy R. Davis
Name (type or print)

Timothy R. Davis
Signature

Environmental Compliance Manager
Title

9-22-15
Date