



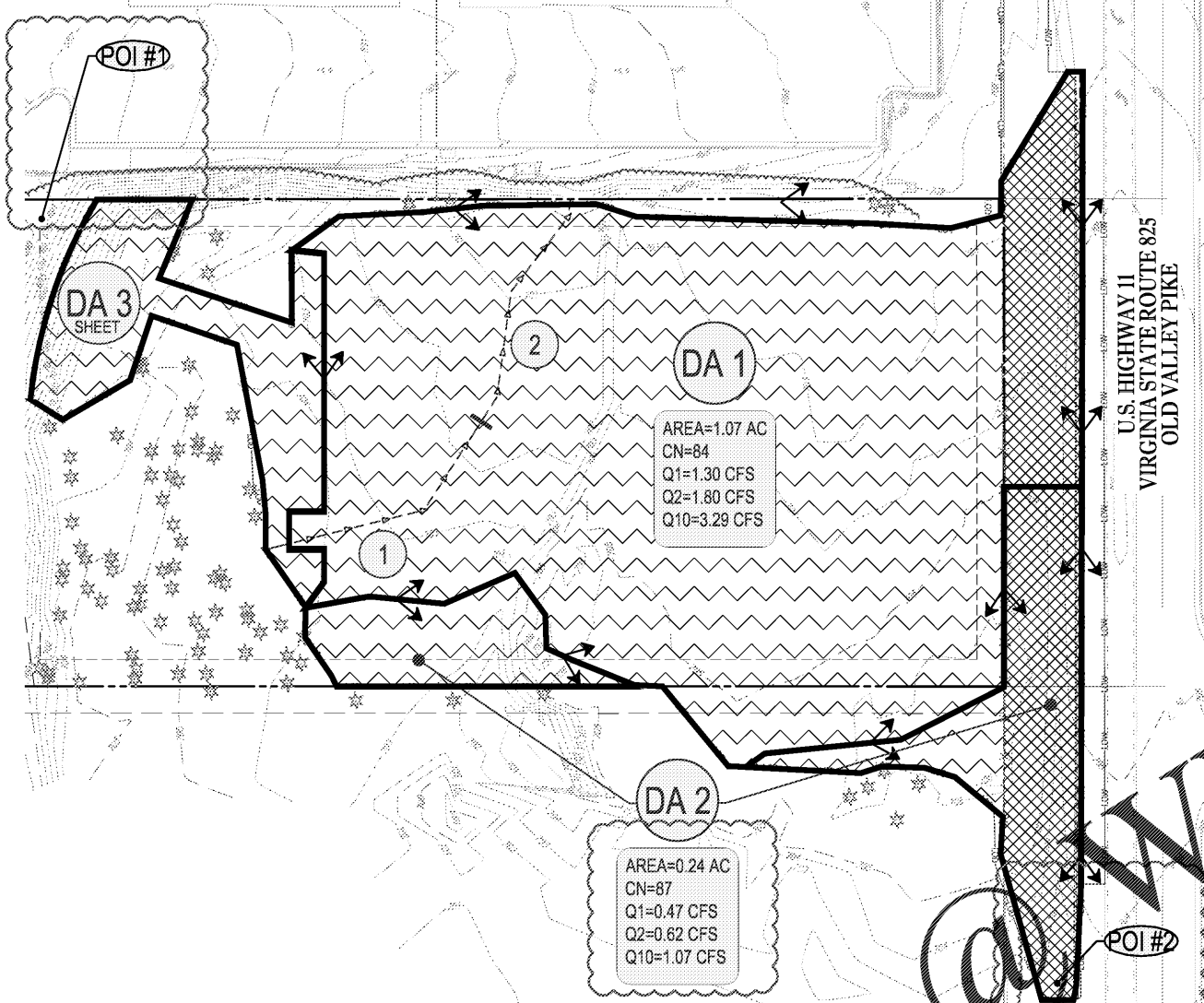
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**PROJECT:**  
NEW O'REILLY AUTO PARTS STORE  
U.S. HIGHWAY 11  
STRASBURG, VA  
**SWM/BMP PLAN**

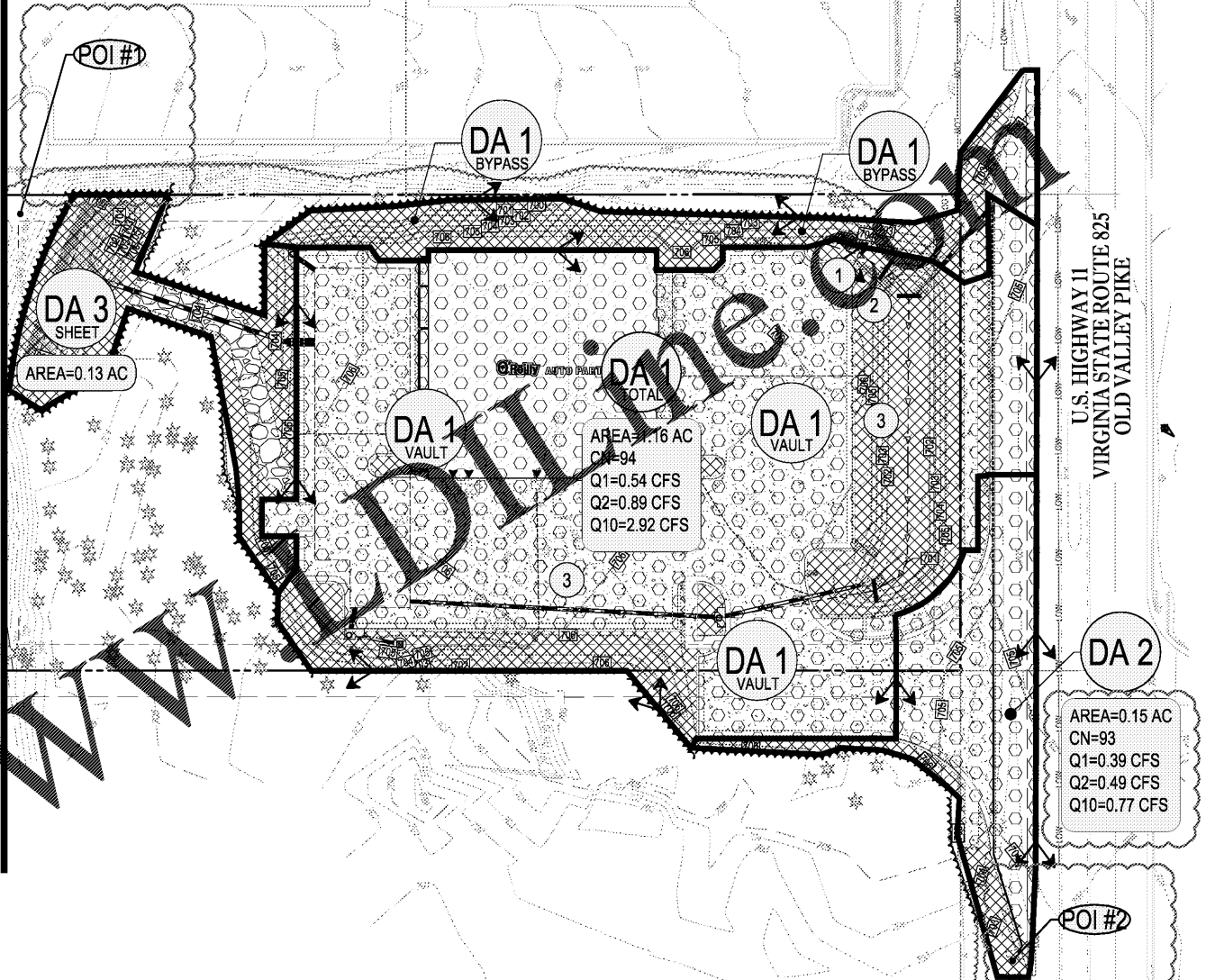
**O'Reilly AUTO PARTS**  
CORPORATE OFFICES  
233 SOUTH PATTERSON  
SPRINGFIELD, MISSOURI 65802  
(417) 862-2874 TELEPHONE

COMM # 4253  
DATE: 11-2-18  
REVISION  
DATE: 3-8-19  
6-20-19  
9-27-19

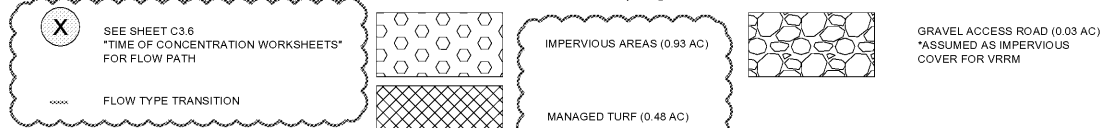
**C3.5**



**1 PRE DEVELOPED DRAINAGE PLAN**  
C3.5 SCALE: 1" = 30'



**2 POST DEVELOPED DRAINAGE PLAN**  
C3.5 SCALE: 1" = 30'



**STORMWATER MANAGEMENT NARRATIVE**

**SITE DESCRIPTION**  
THE PROPOSED PROJECT IS FOR THE DEVELOPMENT OF AN EXISTING PROPERTY TO CONSTRUCT AN O'REILLY AUTO PARTS STORE AND ASSOCIATED SITE IMPROVEMENTS. THE EXISTING PROPERTY IS AN UNDEVELOPED PROPERTY. MOST OF THE SITE IS LOCATED BETWEEN THE EXISTING EDGE OF PAVEMENT AND THE RIGHT OF WAY FENCE. THE TOTAL DISTURBED AREA IS 1.44 ACRES. EXISTING RUNOFF DRAINS TOWARDS THE PROPERTY LINE TO THE NORTHEAST AND TO THE WEST. ROAD RUNOFF IS BEING COLLECTED IN A GRASSY SWALE WITHIN THE RIGHT OF WAY. THIS SWALE FLOWS TO THE NORTHEAST AND THE SOUTHWEST. FOR THE PURPOSE OF ANALYSIS, THE RUNOFF ULTIMATELY DRAINS TO TWO POINTS OF INTEREST: ONE TO NORTHEAST (DA 1 AND DA 3) AND ONE TO THE WEST (DA 2). MOST OF THE POST DEVELOPED RUNOFF DRAINS TO AN UNDERGROUND STORAGE FACILITY THAT OUTFALLS TO A LEVEL SPREADER (DA 1), TO THE NORTHWEST AND EVENTUALLY INTO THE ROADSIDE SWALE (DA 2), AND UNDETAINED SHEET FLOW TO THE DEVELOPER (DA 3). THERE WILL BE APPROXIMATELY 0.36 ACRES OF IMPERVIOUS AREA WITHIN THE LDD.

**STORMWATER NARRATIVE**  
DRAINAGE AREA 1 (DA 1) REPRESENTS THE DISTURBED AREA DRAINING TO THE PROPOSED LEVEL SPREADER AS WELL AS NON-EROSIVE SHEET FLOW TO POI #1. THIS DRAINAGE AREA MEETS CHANNEL AND FLOOD PROTECTION REQUIREMENTS BY THE USE OF A LEVEL SPREADER. AS SHOWN ABOVE, DRAINAGE AREA 2 (DA 2) REPRESENTS THE AREA DRAINING SOUTHWEST TO POI #2. CHANNEL AND FLOOD REQUIREMENTS FOR DA 1 WILL BE MET THROUGH THE USE OF AN UNDERGROUND VAULT WITH A WEIR OUTFALL STRUCTURE TO ATTENUATE THE POST DEVELOPMENT FLOWS. CHANNEL AND FLOOD REQUIREMENTS FOR DA 2 WILL BE MET VIA AN UNDERGROUND VAULT WITH A WEIR OUTFALL STRUCTURE TO ATTENUATE THE POST DEVELOPMENT FLOWS. CHANNEL AND FLOOD REQUIREMENTS FOR DA 3 WILL BE MET VIA AN UNDERGROUND VAULT WITH A WEIR OUTFALL STRUCTURE TO ATTENUATE THE POST DEVELOPMENT FLOWS. CHANNEL AND FLOOD REQUIREMENTS FOR DA 2 WILL BE MET VIA AN UNDERGROUND VAULT WITH A WEIR OUTFALL STRUCTURE TO ATTENUATE THE POST DEVELOPMENT FLOWS. CHANNEL AND FLOOD REQUIREMENTS FOR DA 3 WILL BE MET VIA AN UNDERGROUND VAULT WITH A WEIR OUTFALL STRUCTURE TO ATTENUATE THE POST DEVELOPMENT FLOWS.

**CONCLUSION**  
SINCE THE SITE MEETS CHANNEL AND FLOOD PROTECTION REQUIREMENTS AT ALL POINTS OF INTEREST, AND THE PHOSPHORUS REMOVAL RATE MEETS THE VRRM REDEVELOPMENT PHOSPHORUS REMOVAL REQUIREMENT, IT IS THE OPINION OF THE ENGINEER THAT THE STORMWATER QUANTITY AND QUALITY REQUIREMENTS ARE SATISFIED FOR THIS PROJECT.

**ADEQUATE OUTFALL NARRATIVE**  
THE EXISTING SITE ULTIMATELY DRAINS TO A REGIONAL POND TO THE SOUTHWEST. THE PROPOSED FLOWS HAVE BEEN REDUCED FROM THE EXISTING CONDITION AND THEREFORE, THE ORIGINAL POND DESIGN IS STILL ADEQUATE. DA 1 UTILIZES A LEVEL SPREADER TO ADEQUATELY RELEASE WATER THAT IS DETAINED WITHIN THE PROPOSED STORMWATER FACILITY TO ACHIEVE DESIRABLE SHEET FLOW CONDITIONS AND MEET ENERGY BALANCE. POI #2 RECEIVES UNDETAINED SHEET FLOW FROM THE SITE PERIMETER. THE POST DEVELOPED FLOWS FOR POI #2 HAVE BEEN ANALYZED TO MEET ENERGY BALANCE AND FLOOD PROTECTION REQUIREMENTS, AND IS THEREFORE ADEQUATE.

SINCE THE OVERALL FLOWS TO ALL POIS FOR THE 1-YEAR AND 10-YEAR STORM EVENTS ARE REDUCED WITH THE DEVELOPMENT OF THIS SITE, THESE OUTFALL POINTS ARE CONSIDERED ADEQUATE. AS SUCH, IT IS THE OPINION OF THE ENGINEER THAT ADEQUATE OUTFALL REQUIREMENTS HAVE BEEN MET FOR THE SUBJECT SITE.

AS SHOWN ON THE ENERGY BALANCE CALCULATIONS ON SHEET C3.6, THE REDUCTION IN THE POST-DEVELOPMENT FLOWS IS SUFFICIENT TO SATISFY THE ENERGY BALANCE EQUATION, THEREFORE MEETING THE CHANNEL PROTECTION REQUIREMENTS FOR BOTH POIS. THE 10-YEAR STORM EVENT FLOWS HAVE BEEN REDUCED IN THE POST DEVELOPED CONDITION TO BELOW THE PRE DEVELOPED CONDITION, THEREFORE MEETING FLOOD PROTECTION REQUIREMENTS FOR BOTH POIS.

SINCE BOTH FLOOD PROTECTION AND CHANNEL PROTECTION REQUIREMENTS HAVE BEEN SATISFIED FOR BOTH POINTS OF INTEREST, ALL STORMWATER QUANTITY REQUIREMENTS HAVE BEEN MET AND NO FURTHER ANALYSIS OR CALCULATIONS ARE REQUIRED.

**BEST MANAGEMENT PRACTICES NARRATIVE**  
SINCE THE SUBJECT SITE IS AN EXISTING UNDEVELOPED SITE, WATER QUALITY REQUIREMENTS FOR THE DEVELOPMENT OF THIS SITE WERE CALCULATED USING THE VIRGINIA RUNOFF REDUCTION METHOD (VRRM) NEW DEVELOPMENT SPREADSHEET. USING THIS SPREADSHEET IT WAS DETERMINED THAT THE DEVELOPMENT OF THIS SITE WOULD REQUIRE THE TREATMENT OF A TOTAL OF 1.76 LBS YEAR OF PHOSPHORUS REMOVAL. THE REMOVAL REQUIREMENT WILL BE MET THROUGH THE PURCHASE OF NUTRIENT CREDITS. A NUTRIENT CREDIT AVAILABILITY LETTER HAS BEEN PROVIDED ON SHEET C3.6, SHOWING MORE NUTRIENT OFFSET CREDITS ARE AVAILABLE TO BE PURCHASED WITHIN THE WATERSHED THAN ARE REQUIRED. SINCE THE PHOSPHORUS REMOVAL ACHIEVED BY THESE MEASURES MEETS THE AMOUNT REQUIRED BY THE VRRM NEW DEVELOPMENT SPREADSHEET, ALL STORMWATER QUALITY REQUIREMENTS FOR THIS PROJECT HAVE BEEN MET AND NO FURTHER ANALYSIS IS REQUIRED.



**PLAN REFERENCES**

- REFER TO SWMBMP DETAILS FOR ADDITIONAL SWMBMP NOTES & DETAILS
- THIS PLAN TO BE UTILIZED FOR SWMBMP PURPOSES ONLY



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PROJECT No. V183204 SCALE: 1"=30'  
DRAWN BY / CHECKED BY: DSH/JJR CAD I.D. SS2