

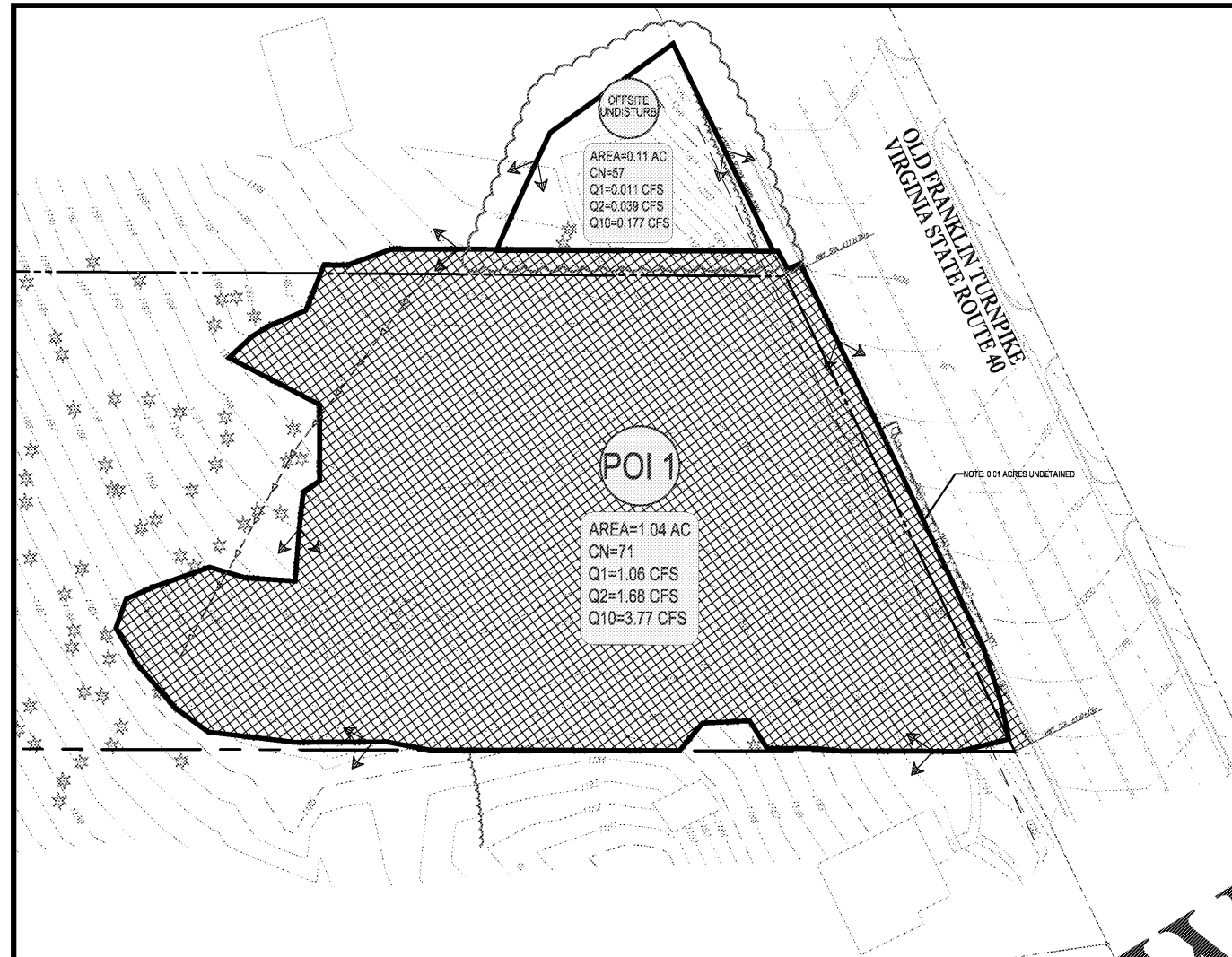
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PROJECT:
NEW O'REILLY AUTO PARTS STORE
OLD FRANKLIN TURNPIKE
ROCKY MOUNT, VA
SWM/BMP PLAN

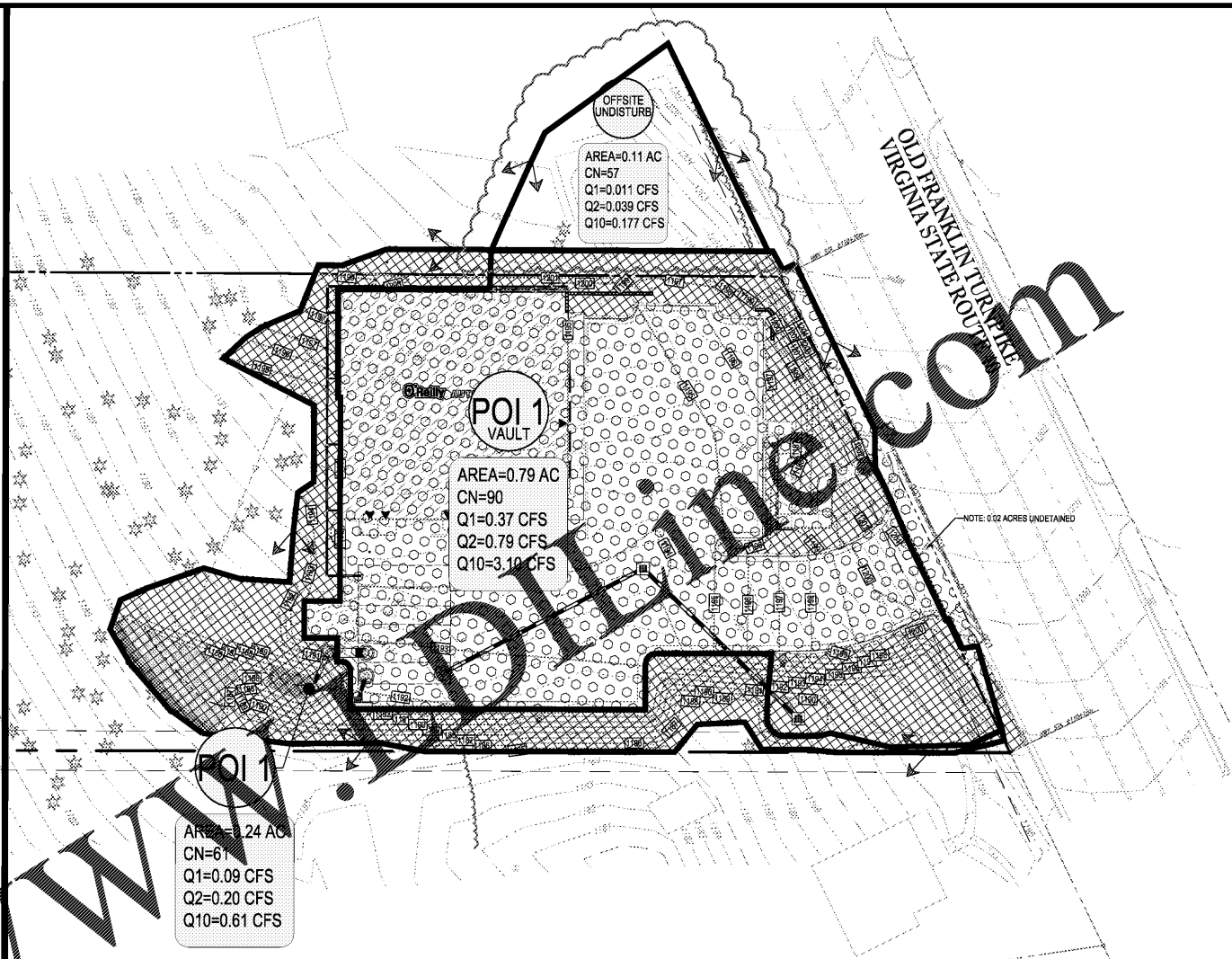
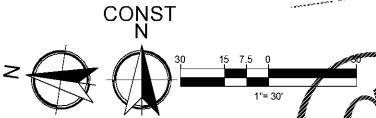
O'Reilly
AUTO PARTS
 CORPORATE OFFICES
 233 SOUTH PATTERSON
 SPRINGFIELD, MISSOURI 65902
 (417) 862-2674 TELEPHONE

COMM # 4252
 DATE: 11-2-18
 REVISION
 DATE: 2-22-19
 4-4-19

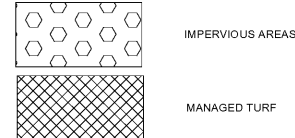
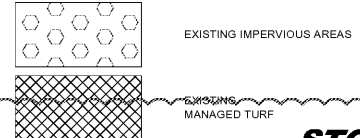
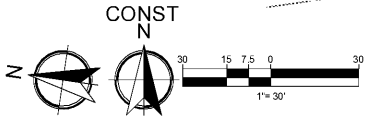
C3.5



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



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



STORMWATER MANAGEMENT NARRATIVE

THE PROPOSED PROJECT IS FOR THE DEVELOPMENT OF AN EXISTING PROPERTY TO CONSTRUCT O'REILLY AUTO PARTS STORE AND ASSOCIATED SITE IMPROVEMENTS. THE EXISTING PROPERTY IS AN UNDEVELOPED SITE THAT IS PREDOMINANTLY FORESTED. WITHIN THE DISTURBED AREA, THERE ARE 0.01 ACRES OF IMPERVIOUS AREA IN THE EXISTING CONDITION. THE TOTAL DISTURBED AREA IS 1.04 ACRES. THE POST DEVELOPMENT CONDITIONS WILL BE 61% IMPERVIOUS (0.83 ACRES) AND 39% PERVIOUS (0.41 ACRES). THE PRE AND POST DEVELOPMENT CONDITIONS WERE ANALYZED AT TWO POINTS OF INTEREST (POI).

POINT OF INTEREST (POI) #1 IS LOCATED AT THE EDGE OF THE SITE AT THE NORTHWEST CORNER AT THE POINT OF ALL OF THE PROPOSED LEVEL SPREADER.

WATER QUALITY REQUIREMENTS FOR THIS SITE WILL BE MET BY PURCHASING 1.0 TONS OF NUTRIENT OFFSET CREDITS TO ENSURE THAT THERE IS NO DEGRADATION TO THE STORMWATER QUALITY CAUSED BY THE DEVELOPMENT OF THIS SITE. WATER QUANTITY REQUIREMENTS WILL BE MET THROUGH THE USE OF AN UNDERGROUND VAULT. THE VAULT IS AN ON-SITE DETENTION SYSTEM THAT UTILIZES A WEIR OUTFALL STRUCTURE. THIS MEASURE ATTENUATES THE POST DEVELOPMENT FLOWS TO MEET ENERGY BALANCE AND FLOOD PROTECTION REQUIREMENTS.

THE PRE AND POST-DEVELOPMENT FLOW RATES FOR THE 1-YEAR, 2-YEAR AND 10-YEAR STORM EVENTS FOR THIS SITE WERE CALCULATED USING THE SCS METHOD IN THE PROGRAM AUTOCAD HYDRAFLOW HYDROGRAPHS, AS SHOWN ON SHEETS C3.6 AND C3.7. TO CALCULATE THE RUNOFF REDUCTION REQUIRED TO MEET THE ENERGY BALANCE REQUIREMENTS, CURVE NUMBERS WERE CALCULATED USING VALUES FROM SCS TABLE 2.2A. RUNOFF CURVE NUMBERS FOR URBAN AREAS. RAINFALL DEPTHS USED TO CALCULATE FLOWS WERE TAKEN FROM NOAA ATLAS 14.

RETURN PERIOD	PRE-DEVELOPMENT FLOW RATES	POST-DEVELOPMENT FLOW RATES
1-YEAR CFS	1.06	0.37
2-YEAR CFS	1.68	0.79
10-YEAR CFS	3.77	3.10

NOTE: FLOWS PROVIDED ARE A COMBINATION OF POI 1 (TO VAULT) AND POI (BYPASS). AS SHOWN IN THE PRE-DEVELOPED DRAINAGE PLAN ABOVE, THE RUNOFF FROM THE 1-YEAR, 2-YEAR AND 10-YEAR STORM EVENTS HAS BEEN REDUCED IN THE POST-DEVELOPMENT CONDITION TO LEVELS BELOW THE PRE-DEVELOPMENT CONDITION THEREFORE MEETING THE FLOOD PROTECTION REQUIREMENTS.

AS SHOWN IN THE ENERGY BALANCE CALCULATIONS ON SHEET C3.7, THE REDUCTION IN THE POST DEVELOPMENT FLOWS ARE SUFFICIENT TO SATISFY THE ENERGY BALANCE EQUATION, THEREFORE MEETING THE CHANNEL PROTECTION REQUIREMENTS. POI 1 BYPASSES 0.24 ACRES OF ON-SITE RUNOFF. THE PROPOSED UNDERGROUND STORMWATER FACILITY WILL OVERDETAIN THE SITE TO ACCOUNT FOR BYPASS FLOWS AND NEGLIGIBLE AREA OF UNDETAINED WATER AT THE SITE ENTRANCE. COMBINED RELEASE RATE OF THE DETENTION SYSTEM AND THE DISTURBED UNCONTROLLED AREA EQUALS 0.43 CFS. THE ALLOWABLE RELEASE RATE FOR ENERGY BALANCE WAS CALCULATED TO BE 0.49 CFS. THEREFORE, THE PROPOSED COMBINED RELEASE RATE MEETS ENERGY BALANCE REQUIREMENTS. SINCE BOTH FLOOD PROTECTION AND CHANNEL PROTECTION REQUIREMENTS HAVE BEEN SATISFIED, ALL STORMWATER QUANTITY REQUIREMENTS HAVE BEEN MET AND NO FURTHER ANALYSIS OR CALCULATIONS ARE REQUIRED.

BEST MANAGEMENT PRACTICES NARRATIVE

SINCE THE SUBJECT SITE IS A NEWLY DEVELOPED 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 AN ADDITIONAL 1.13 LB/YR OF PHOSPHOROUS REMOVAL.

TO MEET THIS REMOVAL REQUIREMENT, NUTRIENT OFFSET CREDITS WILL BE PURCHASED. SINCE THE PHOSPHOROUS REMOVAL ACHIEVED BY THESE CREDITS 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.

CONCLUSION

SINCE THE 1-YEAR, 2-YEAR, AND 10-YEAR FLOW RATES IN THE POST-DEVELOPED CONDITION MEET ENERGY BALANCE AND FLOOD PROTECTION, IN ADDITION TO THE PHOSPHOROUS REMOVAL RATE MEETING THE VRRM NEW DEVELOPMENT PHOSPHOROUS 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 DRAINS TO THE NORTHWEST CORNER OF THE PROPERTY TOWARDS POI 1 AND WOULD SHEET FLOW OVER THE PROPOSED PARKING LOT EDGES. THE PROPOSED DEVELOPMENT BYPASSES 0.24 ACRES OF OFFSITE WATER WITH A CN OF 61, AND OVERDETAINS THE REMAINING IMPROVEMENT AREA OF 0.79 ACRES WITH A CN OF 90. SINCE THE OVERALL FLOWS TO POI 1 FOR THE 1-YEAR, 2-YEAR AND 10-YEAR STORM EVENTS ARE REDUCED WITH THE DEVELOPMENT OF THIS SITE, THIS OUTFALL POINT IS CONSIDERED ADEQUATE. AS SUCH, IT IS THE OPINION OF THE ENGINEER THAT ADEQUATE OUTFALL REQUIREMENTS HAVE BEEN MET FOR THE SUBJECT SITE.



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. V183205 SCALE: 1"=30'
 DRAWN BY / CHECKED BY: DSH/JUR CAD I.D. SS1