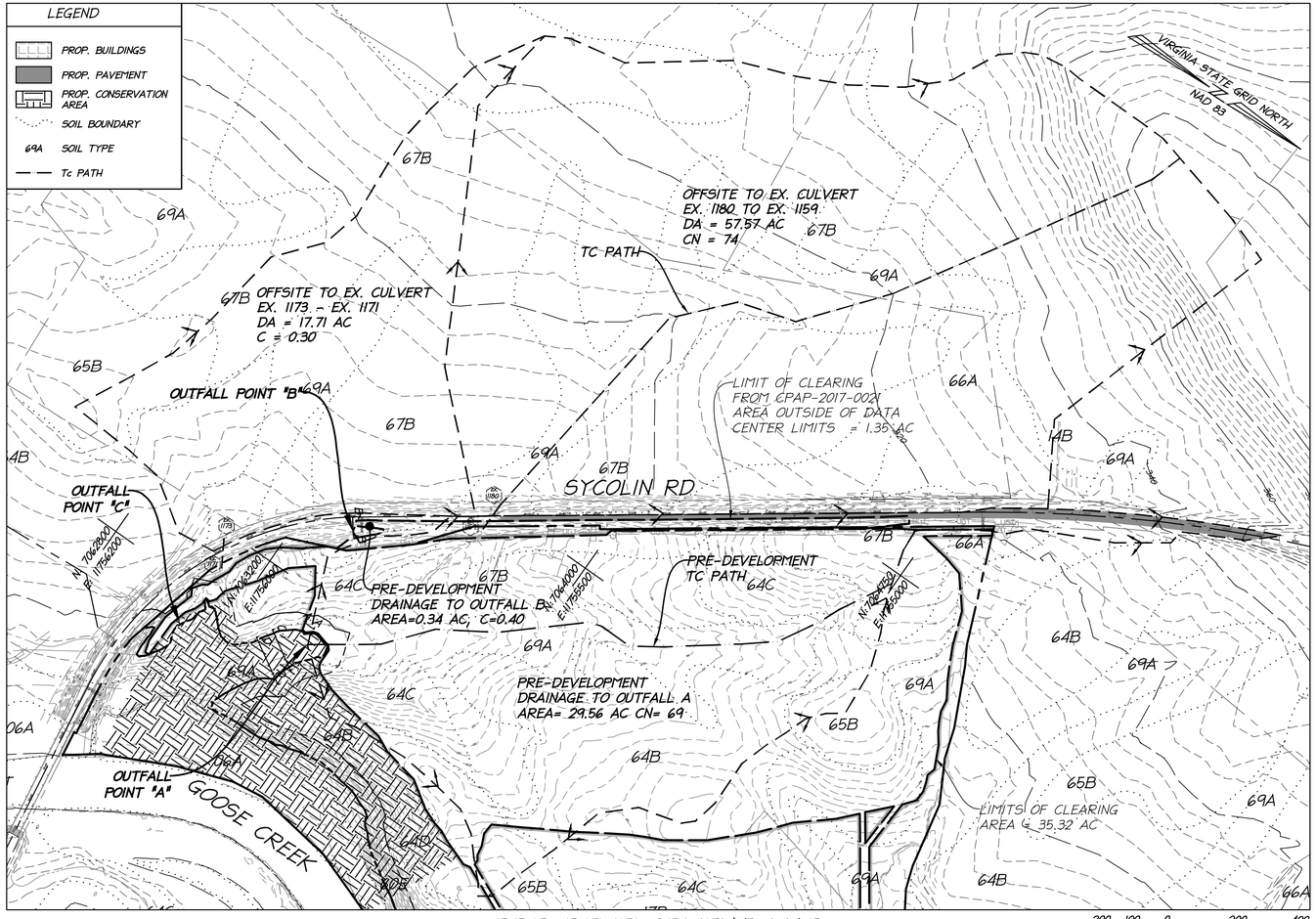
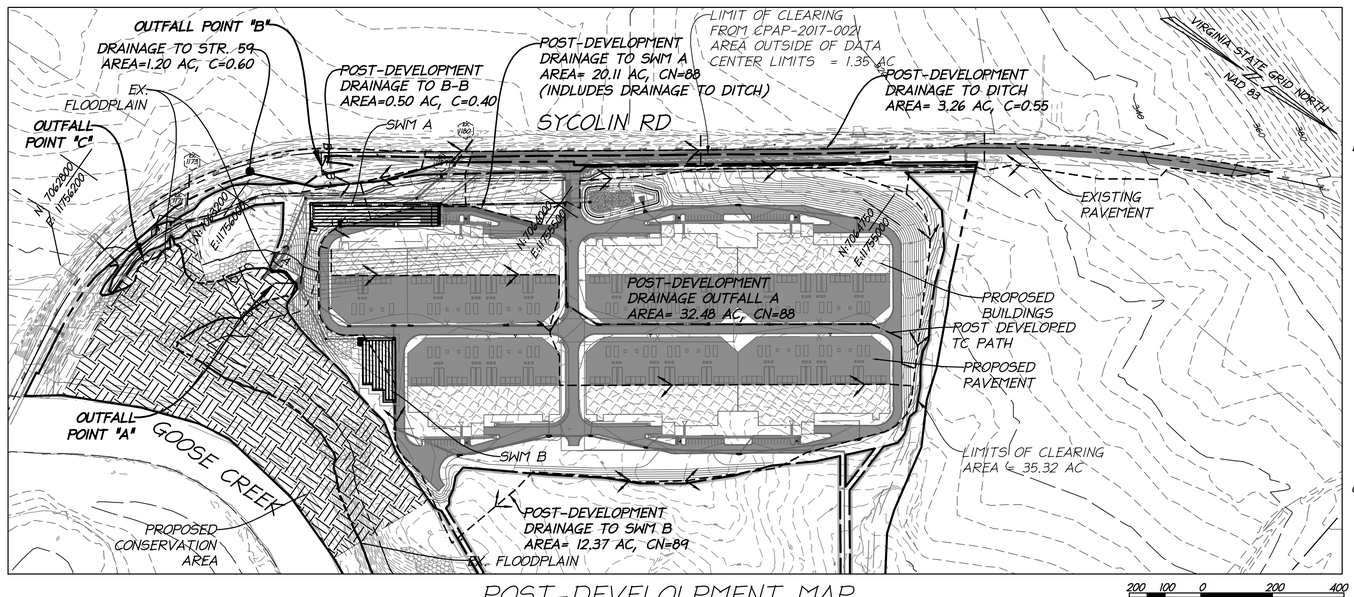


PRE-DEVELOPMENT MAP



POST-DEVELOLPMENT MAP

SWM & ADEQUATE OUTFALL NARRATIVE

THIS SWM PLAN WAS DEVELOPED FOR THE ULTIMATE FUTURE DATA CENTER DEVELOPMENT AND ACCOUNTED FOR THE DISTURBANCE OF 36.67 AC AND 20.71 AC OF NEW IMPERVIOUS AREA. THIS DISTURBED AREA LISTED IN THE COMPUTATIONS INCLUDES BOTH THE 35.32 AC DISTURBED WITH THIS PLAN AND 1.35 AC OF DISTURBANCE ALONG SYCOLIN RD PROPOSED WITH CPAP-2017-0021 THAT IS OUTSIDE OF THE LIMITS SHOWN IN THIS PLAN. THE 0.51 AC OF IMPERVIOUS AREA RESULTING FROM THE PROPOSED TURN LANES AND SITE ENTRANCE PROPOSED SHOWN IN CPAP-2017-0021 IS INCLUDED IN THE TOTAL 20.71 AC OF NEW IMPERVIOUS AREA. THE OVERALL SYSTEM INCLUDES DEDICATED CONSERVATION AREA IN A VRRM EASEMENT, A BIORETENTION BASIN, AND 2 UNDERGROUND SWM FACILITIES.

TWO METHODS WERE USED TO CALCULATED RUN OFF FOR THIS PLAN. AT THE PRIMARY OUTFALL POINT A, THE NRCS METHOD WITH CURVE NUMBERS (CN) WAS USED TO GENERATE THE HYDROGRAPHS NEEDED TO DETERMINE THE PEAK FLOW RATE AND RUN OFF VOLUME VALUES USED IN THE ENERGY BALANCE METHOD. (SEE SHEET 44 FOR HYDROGRAPHS AND COMPUTATIONS) FOR ALL OTHER AREAS, THE RATIONAL METHOD WITH C-FACTORS WAS USED TO FIND THE PEAK FLOW RATE.

3 OUTFALL POINTS WERE ANALYZED IN THE CURRENT AND ULTIMATE CONDITION.

A. THE PRIMARY SITE OUTFALL POINT "A" ANALYZED IS LOCATED ALONG AN EXISTING NATURAL CHANNEL IN THE GOOSE CREEK FLOODPLAIN LIMITS THAT CURRENTLY DRAINS 29.57 AC WITH A CN OF 69 IN A FORESTED CONDITION FROM THE SITE PROPERTY. ADDITIONALLY, 57.57 AC OF OFFSITE AREA WITH A CN OF 72 DRAINS THROUGH AND EXISTING CULVERT (EX. 1180 - EX. 1159) TO THE OUTFALL POINT. THE PROPOSED STORM SEWER NETWORK INCLUDES A CONNECTION TO THE END OF THE EXISTING CULVERT AT STRUCTURE EX. #1159 SO THAT THE OFFSITE FLOW WILL BYPASS THE SITE AND BE RELEASE IN A DESIGNED DITCH TO OUTFALL ABOVE OUTFALL POINT "A". THE BYPASS FLOW FOR THE 10-YR STORM EVENT DOES OVERTOP THE DITCH AND TRAVELS AT PERMISSIBLE VELOCITIES. (SEE SHEET 48 FOR DITCH SECTION AND COMPUTATIONS)

THIS DATA CENTER PLAN PROPOSES TO INCREASES THE AREA DRAINING TO THE OUTFALL POINT FROM THE SITE TO 32.48 AC WITH AN WEIGHTED CN OF 88. TO DETAIN AND TREAT THE EXCESS RUN OFF FROM THE SITE THE FLOW IS DIRECTED TO 2 UNDERGROUND SWM FACILITIES, SWM A & B. SWM A WAS DESIGNED STORE AND TREAT 20.11 AC WITH A CN OF 88 AND SWM B WAS DESIGNED TO STORE AND TREAT 12.37 AC WITH A CN OF 89. SINCE THE SITE IS DISCHARGING INTO A NATURAL STREAM, THE COMBINED RELEASE RATE FROM THE FACILITIES IS DETERMINED BY ENERGY BALANCE METHOD FOR THE 1-YR STORM EVENT. (SEE SHEET 44 FOR COMPUTATIONS)

THE EXISTING STREAM DOES NOT SHOW SIGNS OF FLOODING IN THE CURRENT CONDITIONS AND IS AT THE FLOODPLAIN LIMITS, THEREFORE THE 10-YR STORM EVENT PEAK OUTFALL IS RESTRICTED TO THE PRE-DEVELOPED RATE.

ALLOWABLE RELEASE RATES:	1-YR	10-YR
ENERGY BALANCE METHOD:	2.34 CFS	N/A
PRE-DEVELOPED RELEASE RATE	8.49 CFS	43.21 CFS
POST DEVELOPMENT ROUTED RELEASE RATE	2.30 CFS	42.25 CFS

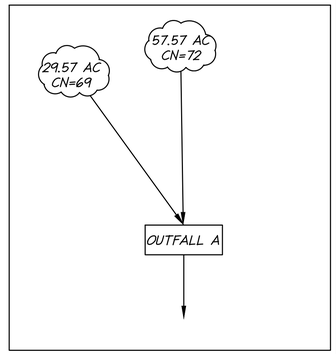
THE ALLOWABLE RELEASE RATES FOR THE ULTIMATE DEVELOPMENT ARE ACHIEVED BY ROUTING THE POST DEVELOPED RUN OFF THROUGH THE PROPOSED UNDERGROUND SWM A & B FACILITIES. THE FACILITIES HAVE DESIGNED CONTROL STRUCTURES THAT COMBINED TO RESTRICT THE PEAK OUTFLOW BELOW THE REQUIRED LEVELS. (SEE SHEET 45 FOR SWM INFLOW HYDROGRAPHS, SHEET 46 FOR SWM OUTFALL HYDROGRAPGHS AND SEE SHEET 47 FOR FOR SWM A STAGE STORAGE CURVE, OUTLET STRUCTURE, AND RELEASE RATES) THE DESIGN PEAK OUTFLOW IN THE POST DEVELOPED CONDITION DOES NOT CAUSE ANY DOWNSTREAM FLOODING. (SEE SHEET 48 FOR NATURAL STREAM CROSS SECTIONS C-C & D-D)

B. OUTFALL POINT "B" IS LOCATED IN A MANMADE ROADSIDE DITCH THAT CURRENTLY DRAINS 0.34 AC THAT INCLUDES A PORTION OF SYCOLIN RD. THE DRAINAGE AREA IS INCREASED TO 0.50 AC IN THE DEVELOPED CONDITION WITH A NEGLIGIBLE INCREASE OF 0.01 AC IN IMPERVIOUS AREA FROM THE PROPOSED RIGHT TURN LANE. THE RESULTING PEAK FLOW RATES FOR THE 2-YR AND 10-YR STORM EVENTS ARE 1.0 CFS AND 1.35 CFS RESPECTIVELY. THE VELOCITY FOR THE 2-YR STORM IN THE DITCH IS 2.19 FT/S WHICH IS WITHIN THE 4.0 FT/S PERMISSIBLE VELOCITY FOR GRASS COVER. THE 10-YR PEAK FLOW RATE RESULTS IN DEPTH OF 0.30 FT WHICH IS CONTAINED WITHIN THE DITCH AND DOES NOT CAUSE ANY FLOODING. (FOR DITCH CROSS SECTION SEE SHEET 48) THE DITCH OUTFALLS INTO ANOTHER EXISTING DITCH THAT CARRIES 17.71 AC OF OFF SITE RUN OFF FROM EX. CULVERT 1173-1171. THE FLOW TRAVELS WITHIN THE BANKS OF THIS DITCH TO A PROPOSED CULVERT 59-58 THAT WAS DESIGNED FOR THIS FLOW AND AN ADDITIONAL 1.2 AC. FROM ON SITE. CULVERT COMPUTATION ON SHEET 32 SHOW THAT THE 36" PIPE IS SUFFICIENT FOR THE 10-YR PEAK FLOW WITH A HEADWATER OF 258.41 WHICH IS CONTAINED WITHIN THE DITCH. THE PROPOSED CULVERT OUTFALL IS EQUIPPED WITH 10' OF CLASS I RIP RAP TO REDUCE THE ENERGY AND PREVENT EROSION AND FLOWS INTO AN EXISTING DITCH IN THE GOOSE CREEK FLOODPLAIN.

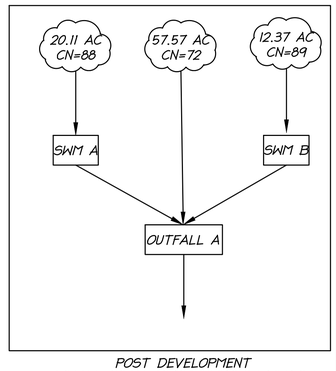
C. THE REMAINING 0.79 AC OF DISTURBED AREA (0.09 AC IMPERVIOUS) THAT IS UNCONTROLLED RESULTS FROM THE INSTALLATION OF THE 6' SIDEWALK ALONG SYCOLIN RD. THE RUN OFF FROM THIS AREA IS NOT INCREASED WITH THE DEVELOPMENT AND SHEET FLOWS FROM THE SIDEWALK APPROXIMATELY 10-15' AT A SLOPE RANGING FROM 5%-12% AT NON-ERROSIVE VELOCITIES ACROSS THE LIMITS OF DISTURBANCE TO PROPOSED CONSERVATION AREA AND THE GOOSE CREEK FLOODPLAIN.

No.	DESCRIPTION	DATE
1	LOUDOUN COUNTY & LOUDOUN WATER COMMENTS	10/26/17

ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT LOUDOUN COUNTY, LOUDOUN WATER AND VIRGINIA DEPT. OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.



PRE DEVELOPMENT
STORMWATER MANAGEMENT SCHEMATIC



POST DEVELOPMENT
STORMWATER MANAGEMENT SCHEMATIC

christopher consultants
9301 innovation drive (suite 150) . manassas, va 20110
phone 703.393.9887 . fax 703.273.6820

COMMONWEALTH OF VIRGINIA
CHRISTOPHER H. LEMON
Lic. No. 047091
10/30/17
PROFESSIONAL ENGINEER

SWM PLAN MAPS
AND COMPUTATIONS

TRUE NORTH DATA
PHASE I - SITE PLAN
CATOCTIN ELECTION DISTRICT
LOUDOUN COUNTY, VIRGINIA

PROJECT NO:17034.001.02
SCALE: 1"=200'
DATE: 8/25/17
DESIGN: LEP
DRAWN: LEP
CHECKED: CHL
SHEET No.
43 OF 63
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