

BROOK RUN PARK MULTI-USE TRAIL – PHASE II

**STORMWATER MANAGEMENT STUDY/
WATER QUALITY REPORT
FOR
CITY OF DUNWOODY, GEORGIA
DEPARTMENT OF PARKS AND RECREATION**

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LA Project 13032**

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I. Introduction

- A. This report evaluates storm water management plans and water quality best management practices for Phase II of the Brook Run Park Multi-Use Trail in the City of Dunwoody, DeKalb County Georgia. City of Dunwoody Stormwater Management Ordinance and the Georgia Stormwater Management Manual apply to this project.
- B. The project to be constructed is approximately 5,720 LF of a 12-foot wide concrete multi-use trail within the existing Brook Run municipal park.
- C. The site is located adjacent to Peeler Road and North Peachtree Road and encompasses ±103.0 acres of which approximately 4.1 acres will be disturbed for the proposed site development.

II. Existing Site Conditions

- A. The site, which used to be operated by DeKalb County Parks and Recreation Department, contained several buildings and parking lots of the Brook Run Hospital from 1965 until 2007 with the main hospital campus in the southwest corner of the site. The hospital pre dates most of the surrounding neighborhoods with no detention facilities controlling stormwater runoff from the building roofs and parking lots before discharging to two unnamed tributaries of Nancy Creek Tributary A. There is an existing detention pond located on-site downstream of the Plantation South assisted living facility and the DeKalb County Fire Station near Barclay Drive. The existing conditions hydrologic model will emulate the condition with the hospital and without the hospital for comparison with the Phase I report findings. The drainage areas to study points 1 and 2 are different to the areas calculated for the Phase I study due to a detailed topographic survey for Phase II that more accurately determined the drainage area divides than the GIS data used for Phase I of the project.
- B. The topographic features of the site identify two study points along the western property line where separate unnamed tributaries of Nancy Creek Tributary A exit the property. The northern most point is study point 1 and the southern is study point 2. There is also study point 3 in the northeast corner of the property at the intersection of Peeler Road and North Peachtree Road. The drainage area to study point 1 is 66.62 acres, the drainage area to study point 2 is 89.43 acres and the drainage area to study point 3 is 2.68 acres.
- C. The peak flows for the existing condition were calculated at all study points for the 1 through 100-year storm event using HydroCAD software and can be seen in section IV of this report and in appendix 4.
- D. The Existing Conditions drainage area map is contained in appendix 1.

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III. Proposed Site Conditions

- A. The proposed conditions analysis will include the improvements made with Phase I of the trail and the sidewalk improvements along Barclay Road. The section of trail within the sheet flow drainage area of the Village Drive homeowners property line has been diverted to the drainage area of study point 2 per the Phase I plans and report. The area diverted is 1.33 acres. Since 2007 a number of buildings and parking areas have been demolished by DeKalb County and the City of Dunwoody, these areas are pasture/greenspace in the post conditions hydrologic model. After diverting areas of the trail the proposed drainage area to study point 1 is 66.46 acres, the drainage area to study point 2 is 91.18 acres and the drainage area to study point 3 is 2.68 acres. To achieve peak flow reduction at study point 2 the outlet structure and pond grading for the existing on-site detention pond will be modified. The proposed conditions hydrologic model will emulate these conditions.
- B. The peak flows for the proposed condition were calculated at the study points for the 1 through 100-year storm event using HydroCAD software and can be seen in section IV of this report and in appendix 5.
- C. The Proposed Conditions drainage area map is contained in appendix 2.
- D. Best Management Practices (BMP):

The modified on-site detention pond will provide water quality treatment for the first 1.2 inches of rainfall from the area draining to the pond. The impervious area to the pond is 3.06 acres and the total impervious area of the Phase II trail and sidewalk improvements along Barclay Road is 1.66 acres so the modified pond will be providing almost twice the required amount of water quality volume treatment. A 2” diameter orifice has been sized in the new outlet structure to treat the water quality volume, see appendix 6. The Total TSS Reduction is 81% on the Georgia Stormwater Management Stormwater Quality Site Development Review Tool, see appendix 8.

- E. Channel Protection:

The modified on-site detention pond will provide channel protection treatment for the area draining to the pond. A 3” diameter orifice has been sized to release the 1-year, 24-hour storm runoff volume over a 24 hour period, see appendix 6. The post-development 1-year peak flow at the study points are below the pre-development peak flow, see the tables in section IV below.

IV. Summary

- A. The post development peak rates of storm water runoff from the site will be at or below the pre-development peak rates at all study points, see tables below for flow summary.

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STUDY PT	Return Frequency	Pre Developed flow @ Study Pt 1 with hospital as impervious* (cfs)	Pre Developed flow @ Study Pt 1 with hospital as pasture* (cfs)	Post Developed Flow @ Study Pt ** (cfs)	% Decrease
1	1	22.32	22.32	22.26	0.2/0.2
	2	34.67	34.67	34.59	0.2/0.2
	5	72.13	72.13	71.96	0.2/0.2
	10	88.78	88.78	88.57	0.2/0.2
	25	124.09	124.09	123.79	0.2/0.2
	50	161.40	161.40	161.01	0.2/0.2
	100	180.62	180.62	180.19	0.2/0.2

*Note: The basin weighted curve number, or CN, is the same for both Pre project scenarios due to the modeling program rounding to the nearest whole number.

**Note: Post developed drainage area is reduced by 0.16 acres due to diversion of Phase II trail to Study Point 2 drainage area.

STUDY PT	Return Frequency	Pre Developed flow @ Study Pt 2 without Phase I and with hospital as impervious (cfs)	Pre Developed flow @ Study Pt 2 without Phase I and with hospital as pasture (cfs)	Post Developed Flow @ Study Pt 2 with hospital as pasture and the diverted area from Phase I trail* (cfs)	% Decrease
2	1	47.00	38.50	35.39	24.7/8.1
	2	67.86	57.26	53.54	21.1/6.5
	5	126.44	111.76	106.41	15.9/4.8
	10	151.78	135.77	129.66	14.6/4.5
	25	204.75	186.39	178.69	12.7/4.1
	50	260.07	239.72	230.28	11.3/3.8
	100	288.56	267.28	258.48	9.4/2.2

*Note: Post developed drainage area is increased by 1.75 acres due to diversion of Phase I and Phase II trail.

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STUDY PT	Return Frequency	Pre Developed flow @ Study Pt (cfs)	Post Developed Flow @ Study Pt (cfs)
3	1	4.47	4.47
	2	5.92	5.92
	5	9.80	9.80
	10	11.42	11.42
	25	14.74	14.74
	50	18.12	18.12
	100	19.82	19.82

PRE-DEVELOPMENT EXISTING DETENTION POND SUMMARY (NODE 2EP)					
Return Frequency	Inflow (cfs)	Outflow (cfs)	Ponding Elevation	Storage (ft ³)	Outlet Pipe Velocity (fps)
1	12.20	12.16	988.86	1,203	12.9
2	15.21	15.17	986.94	1,283	13.8
5	22.95	22.87	987.13	1,475	15.2
10	26.07	25.98	987.20	1,558	16.1
25	32.33	32.14	987.35	1,740	17.3
50	38.59	35.10	988.04	2,743	17.8
100	41.72	36.46	988.47	3,560	18.0

POST-DEVELOPMENT MODIFIED EXISTING DETENTION POND SUMMARY (NODE 2PP)					
Return Frequency	Inflow (cfs)	Outflow (cfs)	Ponding Elevation	Storage (ft ³)	Outlet Pipe Velocity (fps)
1	11.98	0.39	985.34	16,851	4.9
2	15.15	0.49	985.97	21,450	5.3
5	23.35	0.66	987.55	35,066	5.7
10	26.68	0.71	988.14	41,032	5.8
25	33.40	0.80	989.25	53,579	6.0
50	40.14	2.74	989.65	58,592	8.6
100	43.50	5.10	989.76	59,962	10.1

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SUB-AREA	Pre/Post Overland flow, minutes	Pre/Post Shallow Concentrated flow, minutes	Pre/Post Open Channel flow, minutes	Pre-developed Tc, minutes	Post-developed Tc, minutes
1E11/1E1/1P1	25.1/25.1	5.3/5.3	8.4/8.4	38.8	38.8
2E1/2P1	25.1/25.1	6.1/6.1	7.4/7.4	38.6	38.6
2E2/2P2*	-/-	-/-	-/-	10.0	10.0
2E3/2P3	10.9/10.9	13.3/13.3	6.0/6.0	30.2	30.2
2DA	N/A/8.3	N/A/1.4	N/A/1.6	N/A	11.3
3E1/3P1*	-/-	-/-	-/-	10.0	10.0

*Note: Used direct entry Tc of 10 minutes.

SUB-AREA	Pre-developed Curve Number	Post-developed Curve Number
1E11/1E1/1P1	66/66*	66
2E1/2P1	62/70*	62
2E2/2P2	84	82
2E3/2P3	70	70
2DA	N/A	62
3E1/3P1	76	76

*Note: Hospital as pasture and as impervious.

V. Conclusions & Recommendations

- A. The post development peak flow is less than the pre-development peak flow at each study point and the Total TSS Reduction is 81%; therefore, the storm water management and water quality requirements for the multi-use trail project have been met.

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VI. Ten Percent Analysis

The proposed development has two ten percent study points coincident with both study point 1 and 2. At study point 1 the total project site development area for both Phase I and Phase II is 2.44 acres (Phase I = 2.18 acres and Phase II = 0.26 acres) and the drainage area at study point 1 (the property line) is 66.46 acres. At study point 2 the total project site development area for both Phase I and Phase II is 4.24 acres (Phase I = 0.56 acres and Phase II = 3.68 acres) and the drainage area at study point 2 (the property line) is 91.18 acres. Therefore no adverse impact is anticipated due to this project at both 10% Study Points.

The ten percent study point has been indicated on the existing conditions and proposed conditions drainage area maps included in the appendix. A 10% study summary has been included in this report, which compares existing and proposed peak flows, see table below.

STUDY PT	Return Frequency	Pre Developed flow @ 10% Study Pt 1 with hospital as impervious (cfs)	Pre Developed flow @ 10% Study Pt 1 with hospital as pasture (cfs)	Post Developed Flow @ 10% Study Pt 1 (cfs)
1 10% SP	1	22.32	22.32	22.26
	2	34.67	34.67	34.59
	5	72.13	72.13	71.96
	10	88.78	88.78	88.57
	25	124.09	124.09	123.79
	50	161.40	161.40	161.01
	100	180.62	180.62	180.19

STUDY PT	Return Frequency	Pre Developed flow @ 10% Study Pt 2 without Phase I and with hospital as impervious (cfs)	Pre Developed flow @ 10% Study Pt 2 without Phase I and with hospital as pasture (cfs)	Post Developed Flow @ 10% Study Pt 2 with the diverted area from Phase I trail (cfs)
2 10% SP	1	47.00	38.50	35.39
	2	67.86	57.26	53.54
	5	126.44	111.76	106.41
	10	151.78	135.77	129.66
	25	204.75	186.39	178.69
	50	260.07	239.72	230.28
	100	288.56	267.28	258.48