

DEPARTMENT OF PLANNING & SUSTAINABILITY

REVIEW CHECKLIST for
STORMWATER MANAGEMENT PLANS

DEVELOPMENT NAME: _____ **(PHASE/UNIT)** _____
TAX PARCEL NUMBER: _____ **ADDRESS:** _____
DISTRICT: _____ **LAND LOT:** _____ **ZONING DISTRICT:** _____ **OVERLAY:** _____
REVIEWED BY: _____ **ENGINEER/PHONE:** _____
DATE: _____ **PROJECT NUMBER:** _____
COMMERCIAL_ INDUSTRIAL_ MUNICIPAL_ RESIDENTIAL_ MIXED_

Note: Plans must adhere to guidelines in the Georgia Stormwater Management Manual (GSMM) Volumes I, II, and III as well as the DeKalb County Government Ordinances inclusive of Chapters 14, 22.5, and 27. Specific references are made to Chapter 14 Sections 37, 38, 39, 40, 42, 44.1, 166, 167, 217, 218, 219, and Article 4.

Provide the following:

A. BACKGROUND/GENERAL INFORMATION

- 1 Development name on the cover of the report
- 2 Engineer's seal, signature, address and telephone number on the cover of the report
- 3 Developer's name, address, and telephone number on the cover of the report
- 4 Date on the cover of the report and vicinity map in the report
- 5 Include revision date on the cover of the report
- 6 Provide statement of post-construction pond/storm water drainage ownership.

B. REGULATORY

1 For all proposed developments, including public single-family residential, execute and return the attached Operation & Maintenance Agreement. The Agreement must be approved and recorded prior to the pre-construction meeting. The agreement must state the deed book and page of the property in addition to defining minimum recommended post construction inspection and maintenance schedule and site specific plan.

2 A stream buffer variance is required for encroachment of stream buffers.

3 Contact the Army Corps of Engineers for permit determination/approval. ACOE approval is required prior to stormwater plan approval if it applies to the proposed scope of work.

4 Provide flood study per the Flood Plain Management Ordinance and in accordance with FEMA approved methodology if it applies.

5 Add engineer's certification to plans: "Engineer certifies that the flood study was prepared in accordance with a FEMA approved methodology". IF a LOMR or CLOMR, etc. is needed, the Applicant must send documents to FEMA w/copy sent along with plans.

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6 Provide wetlands delineation. Show limits and area (acres or square feet) of encroachment and the 25' undisturbed DeKalb County buffer.

7 Offsite easements are/may be required (see plans). (Offsite easement needed for stormwater on a permanent basis must be delineated, legal description written and recorded in perpetuity at DC courthouse).

8 Other _____

C. STORMWATER MANAGEMENT REPORT/HYDRO

1. The submittal does not meet the requirements of the DeKalb County ordinances and G.S.M.M. Please refer to the appropriate sections in the regulations that cover the topics of water quality treatment volume, channel protection volume, over-bank flood protection etc and comply.

2. Consider the use of available Better Site Design (checking for availability for usage to decrease the size of the pond) "credits" to reduce WQV and CPV.

3. Provide supporting engineering calculations for all Better Site Design "credits". Please see Section 1.4.4 of the GSMM for a complete listing of all available design credits.

4. Provide brief summary of Better Site Design "credits". Per the GSMM, design credits cannot be claimed twice for the same area. Credit areas and features must be identified and delineated on the construction drawings and final plat.

5. Provide executive summary of the report's findings to include a table similar to:

Flow Summary

Basin	Cumulative Drainage Area	Return Frequency Storm (yrs)	Precipitation Value for 24 hour Event (inches)	Pre- development Flow (cfs)	Post- development Flow (cfs)	Ponding Elevation (ft MSL)	Storage (cubic feet)
		1					
		2					
		5					
		10					
		25					
		50					
		100					
		10% D.S.					

DeKalb County requires post development release flow rates not to exceed pre development flows.

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6. Include a narrative paragraph/summary in the report that includes a description of existing site, soils, slopes, vegetative cover, and proposed improvements, methodologies and procedures, calculations, summary of results and a conclusion detailing the findings of the drainage investigation.

7. State the existing and proposed impervious surface by acre and percent of site for each basin.

8. Provide a breakdown of proposed impervious surface by roofs, roads, sidewalks, access drives, driveways, etc.

9. Delineate all drainage areas/basins to include offsite drainage and bypass.

10. Detailed pre and post developed drainage area maps are required.

11. DeKalb Rational "C" and/or SCS "CN" values need clarification and/or further explanation (see hydro).

12. **Show** segmented time of concentration (TC) **flow paths on scaled** drainage maps.

13. The time of concentration (TC) for pre and/or post developed conditions needs clarification and/or further explanation (see hydro).

14. The SCS method and other approved methodologies are required for detention analysis. The Flow Summary Rational method is only acceptable for pipe design within certain acreage limits. The DeKalb Rational Method can be used for detention design for drainage areas up to 5 acres.

15. A 10% downstream analysis is required. See GSMM

. Provide basin drainage map showing P05, and peak flow analysis results with and without detention.

16. The 10% downstream analysis must specifically prove and state that no structures (businesses, homes, culverts, streets, etc) between the analysis points will be adversely impacted by the increase in site runoff.

17. Provide WQV and CPV calculations.

18. Provide fore-bay calculations (0.1"/acre of impervious area). Can be counted towards total WQV.

19. Provide WQV and/or CPV orifice sizing calculations for the 24-hour drawdown.

20. Round orifice size up to the next highest whole number (e.g. computed = 2.6", round to 3").

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21. Spreadsheets for WQV, CPV, Orifice sizing, Bio-retention, Sand Filter sizing, and othe Green Infrastructure/Low Impact Development features and the Manning's Equation. Please use and include these with your submittal.
 22. The pond report (stage-storage) does not agree with what is dimensioned on the plans.
 23. The volumes required by the hydro do not agree with the proposed pond grading on the plans.
 24. Provide 50% of net WQV as dead pool storage for Wet Extended Detention pond.
 25. Micro pool pond required (for less than 10 acre drainage areas). Show 25-30% of net WQV as dead pool storage.
 26. Show that the 100-year storm, including offsite pass-through, is safely passed around or through the pond and through the emergency overflow weir. Otherwise, show how the offsite will be managed.
 - 27. Disturbed bypass areas greater than 10% of the drainage basin require water quality treatment.**
 28. Extended dry detention may be used to fully meet CPV, Qp25 and Qf (The 100-year, 24-hour storm event) requirements only.
 29. Extended dry detention must be used in conjunction with other onsite BMPs to meet the 80% TSS water quality requirements of the GSMM.
 30. Underground detention must comply with Section 3.4.3 of the GSMM.
 31. Include Outlet Control Structure (OCS) and pond cross section details in the study. See Section 3.2, and Appendix in the GSMM for pond detail requirements.
 32. If CPV is waived, then the 2 through 25 year attenuation is required as well as safely passing the 100 year storm.
 33. If WQV and CPV requirements are met, the only additional requirements are flood control for the 25-year event and safe passage of the 100-year event.
 34. Other _____
 - 35. For projects other than stormwater hotspots, if less than 40 % of the site is being disturbed only that portion of the property is required to meet the stormwater compliance regulations.**
 - 36. Minimize the area of land disturbed, designing to maintenance existing grades where practical and maximizing the use of low impact features and Green**
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Infrastructure as much as practical. Include best management practices per volume three of the G.S.M.M.

D. PLAN/DETAIL SHEETS

1. Show existing and proposed R/W lines, lot lines/building envelop pavement and other impervious areas, curb and gutter, and R/W widths.
2. Provide floodplain statement. Reference the 2013, or most recent, FEMA Firm Panel number and any applicable CLOMA.
3. Provide wetlands statement. (The statement is to indicate if the site is within any area of a wetland)
4. Delineate wetland areas and note the areas (in acres/ft²) to be impacted. Show 25' wetland buffer.
5. Provide a copy of wetland study and/or N.W.I. Map number. (This is if the site is within a wetland area and the map that the information came from).
6. Show areas of proposed cut/fill in the floodplain. Provide cut and fill sections. Cut and fill must balance, within boundary of site against floodplain. See Floodplain Management Ordinance for additional cut/fill requirements.
7. Show all existing and proposed lakes with surface area, normal pool elevation, and dam height, top width, % slopes. Provide details for existing/proposed outlets/drain pipes and spillways.
8. Show/note all Minimum Floor Elevations (MFE) for all lots located adjacent to the FEMA designated flood hazard area. For residential developments, the MFE is measured as 3' above the 100-year flood elevation to the bottom of the footing, or one foot above top of dam or wall.
9. Show/note the 100-year flood plain limits/sections, elevations, floodway limits. Indicate the source of the information.
10. Provide a copy of FEMA approved methodology flood study.
11. Show the 25' (state) and 50' (county) undisturbed stream buffers from the edge of wrested development.
12. Show stream buffer as measured from the wrested bank, not the centerline of the creek.
13. Show/note the boundaries of other natural feature protection and conservation areas such as wetlands, lakes, ponds, and other setbacks (e.g. septic tank and drinking water well setbacks).
14. Provide plan view of major manhole junctions to include pipe sizes, materials, angles and invert elevations.

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15. Identify/show/delineate all Better Site Design "credits". **Note on plan that any conservation areas will be recorded at the DeKalb County Courthouse in perpetuity with the affected properties.**
16. Show grading of all open channels. Include cross-sections and calculations to provide 25-year storm capacity, velocities, dimensions, freeboard, and permanent grassing/sodding details to sustain the Q_{p25} velocity.
17. Drainage other than sheet flow across two or more lots requires a dedicated drainage easement. Define any such drainage easements with adequate labels.
18. Show a 15 ft minimum Access/Maintenance easement to and 10 ft minimum around the outer limits of the pond(s).
19. Use Figure 1 at end of this section to determine the minimum drainage easement width requirement per Section 14-40b (Standards) (10' minimum).
20. Show storm sewers extending to the rear of the lot unless discharging to defined channel approved by the Land Development Department.
21. Show water quality ponds and BMPs outside of creeks/streams, floodplains, wetlands, and buffers.
22. General minimum slope for pond(s) is 3:1. Show 3:1 grading of pond(s).
23. Residential pond(s) should be located within a subdivision common place. No part of the facility should be located on private property.
24. Pond construction requires minimum setback of 20' from property line, 100' to 250' from a Private well and 50' from a septic tank/leach field
25. Show and dimension the aquatic bench.
26. Show the fore bay. (0.1" per impervious acre)
27. Show the micro pool (25-30% of net WQV).
28. Show a safety bench if the pond is deeper than 4' or required slopes of greater than 3:1.
29. Provide pond under drain (3" mm. drain pipe with 3" mm. gate valve located in OCS). Also, provide manufacturer and maintenance specs.
30. Add note to plan: "The pond's maintenance under drain is intended to drain the pond for infrequent maintenance and inspection purposes. The gate valve must be closed immediately after construction of the pond. After construction is completed, it can only be opened upon authorization by the DeKalb County Land Development Department."

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31. Provide a complete pond profile detail sheet including compaction detail, water surface elevations, structure and freeboard elevations, perforated and wrapped under drain pipe, material specifications, cutoff trench with anti-seep collar, orifice and spillway sizes and location, minimum 10' embankment berm width and minimum slopes of 3:1 per GSMM. (excavated ponds only require an 8' berm).
32. Provide construction detail for emergency spillway.
33. Consider use of reverse slope pipe attached to riser, with its inlet submerged 1' below the permanent pool elevation.
34. for earthen embankments, use impervious cut-off trench with anti-seep collar to restrict piping of soils through embankment.
35. Provide a trash rack or skimmer hood. (a flat top trash rack is not advised for private developments. It is not allowed for public single-family residential developments). Trash rack must have 10 times the surface area of the orifice it protects.
36. Provide a wetland seeding schedule for extended detention wet pond. See Appendix F of the GSMM.
37. Add note to plan: "No woody vegetation is allowed within 15' of the downstream toe of earthen embankment". (i.e. stumps, etc)
38. Add note to plans that all retaining wall designs greater than 4' in height shall be submitted and approved by the DeKalb County Land Development Department prior to installation. Keystone block walls are unacceptable for the pond's retaining wall.
39. HDPE pipe is only allowed outside of the R/W and on non-single family projects (i.e. commercial, industrial). (Junction boxes are required to have manhole access. Plans should reference AASHTO M294 requirements.
40. Provide pipe bedding detail.
41. Show curb inlet placement at low points in road.
42. Show the 100-year ponding elevation at inlet. Ponding shall not occur on adjacent property without obtaining a drainage easement.
43. Provide appropriate energy dissipation devices at all pipe outlets, open channels, and outlet control structures and culverts if exit velocities exceed 4 fps. Show/note the type of energy dissipation to be provided. Provide sizing calculations if rip-rap is proposed.
44. Provide emergency spillway construction detail.

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45. Provide 5' chain link fence with two (2) 10' gates to be placed **at the outer edge** of the 10' access easement **around the pond**.

Figure 1

Drainage Easement Worksheet

The following formula/worksheet is a tool to be used in determining the required width for drainage easements assigned to storm pipes.

The minimum required easement width for storm pipe installation is a function of the required clearance on each side of the pipe, the pipe diameter, the embankment slope and the pipe's depth at the deepest point.

Given a minimum 2 feet of clearance between the pipe walls and an embankment slope of 2:1 (H:V), the formula is:

Minimum easement width = 4' + diameter + (4 x maximum depth) = total easement width (feet), to be centered on structure/pipe.

E. PIPE PROFILES/CULVERT DESIGN/OPEN CHANNELS

Pipe

1. Show a minimum of 18" of cover for pipe. Additional cover may be required depending on expected loading.
2. All pipes requiring a manhole base larger than 48" in diameter must be identified by showing base unit and reduction cone, inverts of pipes, etc.
3. Verify that the pond outlet discharge pipe has been checked for inlet and outlet control.
4. Match crowns on adjacent pipe.
5. Provide a minimum of 12" vertical and horizontal separation between all buried utilities & storm pipes.
6. Show all sanitary and water line, and other utility crossings on storm profiles.
7. Show catch basin top and pipe invert elevations.
8. Show curb inlet at low point of Street
9. Provide pipe profiles with existing and proposed ground surface profiles, pipe lengths, slopes, inverts, type, and hydraulic grade lines.
10. Show 25-year hydraulic grade line. It must be below the crown of the pipe. Please provide supporting data in pipe profile chart or hydro study.

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11. Note on plans: All storm pipe and structures shall comply with GADOT standards for design, construction, and installation.
12. Inverts on all structures shown to be paved smooth.
13. All metal pipes used must be BCCMP with re-rolled ends and hugger/corrugated bands used for connection.
14. Minimum acceptable pipe diameter is 18 inches.
15. Minimum slope is 1% for BCCMP and 0.50% for RCP. For slopes < 1%, show that a minimum of 2.5 fps is attained for the 2-year frequency event.
16. Velocity in pipe No. (s) _____ exceeds 15 fps. Velocities should be between 3-15 fps.
17. CMP' or BCCMP pipe(s) exceed(s) 12% slope. RCP pipe exceed(s) 12% slope.
18. On CMP pipe exceeding a 12% slope, show anchor collars. Provide construction detail and locations.
19. RCP is recommended under roads.
20. Angle conflict among pipes will require a larger manhole for structure.

Provide Pipe chart indicating the following:

1. Pipe Numbers
2. Invert elevations
3. Pipe Sizes
4. Pipe Slope
5. Pipe Length
6. Contributing Drainage Area
7. Design discharge (Q25 for piped drainage; Q100 for culverts)
8. Design storm frequency (25-year for piped drainage; 100-year for culverts)
9. Runoff Coefficient for CMP
10. Pipe material/coating. Indicate corrugation spacing and height
11. Velocity (V25 may not exceed erosive velocity at outlet headwall unless additional energy dissipation is provided.)
12. Gutter spread (not to exceed eight feet in width for a 10-year design storm event)

Open channel chart indicating the following:

1. Open Channel Numbers
2. Contributing Drainage Area
3. Runoff coefficient (per future land use plan and assuming no detention)
4. Conveyance Size. Provide typical cross section
5. Lining Material (riprap, sod, vegetative, etc.)
6. Channel Length

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7. Channel Slope (for min and max values)
8. Velocity (V25 may not exceed erosive velocity)
9. Design Storm frequency (25-year)
10. Design discharge (25-year)
11. Normal flow Depth (25-year)
12. Indicate free board capacity

Culverts

1. Headwater & Tail water Limitations: for drainage facilities with cross-sectional areas equal to or less than 30 ft², HW/D for the 100-year frequency storm must be equal to or less than 1.5. For drainage facilities with cross-sectional areas greater than 30 ft², HW/D for the 100-year frequency storm must be equal to or less than 1.2. Culverts must be sized to maintain flood-free conditions on major thoroughfares with at least 18-inches freeboard at the low-point of the road. (All criteria from Section 4.3, culvert design, of the GSMM are required.)
2. As stated above, inlet/outlet control calculations are required for all street crossings in addition to Manning's equation. Insure that Tc is representative of the drainage area.
3. The weighted runoff coefficient for major culvert analysis ($Q=CfCIA$) should be based on full build-out using the current zoning plan for the entire receiving area (Cf = Frequency factor).
4. Show 25-year ponding limits above pipe (culvert) unless detention or floodplain conveyance.
5. Show 25-year hydraulic grade line in all culverts unless detention or floodplain conveyance.
6. RCP is required for culvert(s) placed in streams with any base flow.

OTHER REVIEW

COMMENTS:
