

GLYNN COUNTY LOCAL DESIGN MANUAL

Introduction:

This manual is intended as a reference document and should be used in conjunction with the “Georgia Stormwater Management Manual” as revised. The criteria and specifications included in this manual outline the requirements for development in Glynn County.

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Design and Physical Requirements

This section lists the minimum design requirements specific to stormwater drainage system design and requirements for materials used in the stormwater system.

I. Detention:

1. The storage volume shall be sufficient to contain the 50-yr/24-hr storm event.
2. An emergency overflow shall be provided to accommodate the 50-year storm event above the live retention volume.
3. The detention pond area will be defined either at the 50-yr/24-hr water surface elevation or 6-inches above the 50-yr/24-hr water surface elevation, if water is intended to pond in road rights-of-way. The detention pond shall be contained on a single parcel of land.
4. The pipe or ditch section required to carry the design storm shall not be used in the calculation of pond storage volume.
5. The 50-yr/24-hr water surface elevation may be set to allow a maximum of 6-inches of water to pond in roadways. However, the volume of water storage outside of the defined limits of the pond cannot be included in the storage volume for the pond.

Wet

- The average normal water depth should be a minimum of 4-ft.
- Pond outlet shall be designed to drain down the pond for maintenance.
- The pond shall have a maximum bank slope of 3:1.

Dry

- Pond shall be designed with bottom slope sufficient to drain pond completely with a maximum bank slope of 3:1.

II. Retention:

1. Percolation tests at the site and elevation of the finished pond are required to support any infiltration used in volume calculations.
2. The retention volume shall be sufficient to contain the 50-yr/24-hr storm event.

III. Pipe and Culvert

1. Only HDPE or RCP can be used for permanent pipe installations.
2. Pipes shall be installed per manufacture recommendations and Glynn County standards.
3. Minimum cover for RCP is 12-inches. Minimum cover for HDPE is included in Table A

4. All RCP joints shall be wrapped with Amoco Non-woven Needlepunched Geotextile #4545(or approved equal). The fabric shall extend, in each direction from the pipe joint, a minimum of 18-inches or ½ of the pipe diameter whichever is greater.
5. An adaptor, approved by the HDPE pipe manufacturer is required at transitions from HDPE to RCP pipe and when using a concrete flared end section on HDPE pipe.
6. A storm drain manhole will be included at each change in the alignment of the storm drain (both horizontal and vertical).
7. Bends in a pipe alignment may be approved by the County Engineer on a case-by-case basis.
8. Pipes not in rights-of-way shall be installed along the center of a drainage easement. Drainage easement widths should be sized to provide for maintenance and replacement. The minimum width for privately maintained drainage easements is 14-ft. The minimum width for publicly maintained drainage easements are:
 - a. 20-ft for pipe diameters 24-inches or less*
 - b. 30-ft for pipe diameters 25-inch through 48-inch *
 - c. The County Engineer will determine the easement requirements for pipes with diameters greater than 48-inches* easement widths for installations involving pipe cover of 5-feet or more will be individually determined by the County Engineer
9. Pipes, day-lighting into open channels or ponds shall have inverts at or below the normal water surface elevation of the pond or outlet protection shall be designed and installed to stabilize the bank slope. Also, pipes that are subject to water elevations, either fluctuating or sustained, above the crown of the pipe, shall be RCP or ended with a concrete structure.
10. Pipes or structures outfalling into open channels shall match the invert of the open channel, or the outfall and channel will be designed/modified to accommodate the erosive forces at the elevation transition.
11. Cross drain pipes under roads will intersect the road at 90-degrees. A maximum of 15-degrees of skew may be allowed on a case-by-case basis.
12. Pipes shall intersect straight pond banks or open channel alignments within 15-degrees of perpendicular. Pipes shall intersect curved pond banks or curved open channel alignments within 15-degrees of a radial alignment.
13. Driveway pipes, installed in the right-of-way, shall be installed per the Glynn County Standard detail titled Typical Driveway Pipe Installation. Glynn County Public Works may approve installations not conforming to the Typical Driveway Pipe Installation detail on a site-specific basis.

14. All pipes shall be designed to accommodate the 25-year peak flow.
 - a. For fully piped systems, the maximum water surface elevation allowed at any structure will be 6-inches above the flow line at that structure (i.e.: grate elevation or throat elevation).
 - b. For drainage systems that use roadside ditches, the maximum water surface elevation shall be 6-inches below the edge of pavement.
15. Pipe designs must consider the existing development conditions for any offsite upstream drainage basins.
16. Pipes designated as *critical* shall be designed to accommodate the 50-year peak flow. Examples of critical pipes include, but are not limited to:
 - a. Cross-drains installed where failure will result in road flooding greater than 6-inches or property flooding to the finished floor elevation unless an emergency overflow is provided that is maintainable and can accommodate the 50-year peak flow.
 - b. Pipes that, due to construction or access restrictions, will be difficult to replace or upgrade (i.e. railroad, highway, arterial, utility easement crossings).
 - c. Pipes carrying the runoff from an offsite drainage basin greater than 10-acres through a site.

IV. Open Channel

1. Open Channels are all those open drainage structures designed primarily for stormwater conveyance including ditches, swales, trenches and the like.
2. The minimum channel design shall accommodate the 25-year peak flow. Channels that are designed as both water quality and stormwater conveyance structures shall be designed excluding the channel section used for water quality from the cross-section used to determining the flow capacity of the channel.
3. Open channels shall be designed to have positive flow.
4. The maximum bank slopes for un-reinforced open channels are defined as:
 - a. 3:1 for mandarin fine and similar soil types.
 - b. 2:1 for other soil types.
5. Open channels shall be designed with a full flow velocity not to exceed the erosive velocity of the material used to line the channel.
6. Open channels not in rights-of-way shall be contained in an easement wide enough to accommodate the full width of the channel plus a continuous 15-ft maintenance access strip.
7. Alignment changes in open channels shall be designed to accommodate the erosive forces and the energy grade line through the change in alignment.

8. Inverts should match at intersections, or the intersection will be designed/modified to accommodate the erosive forces at the transition.
9. Open channel designs must consider the current development conditions of any offsite upstream drainage basins. Any open channel carrying the runoff from an offsite drainage basin greater than 10-acres through a site will be designed to accommodate the 50-year storm event.

IV. Appurtenances

1. All storm drainage appurtenances shall meet Ga-DOT specifications.
2. Those appurtenances not included in the Ga-DOT standard specifications shall be structurally designed by a Professional Engineer registered in Georgia to a level of safety equal to or greater than the Ga-DOT requirements.
3. One-way check valves shall be duckbill type valves designed for stormwater applications. Flapper type valves may be allowed on a case-by-case basis if the material and installation is approved by the County Engineer

Hydrologic Methods

Stormwater drainage systems shall be designed in accordance with Chapter 2 of the Georgia Stormwater Management Manual, Volume 2, with the following restrictions.

1. The rational method may be applied to projects totaling less than or equal to 25-acres.
2. Detention or retention systems shall be designed to the 50-yr/24-hr storm event.
3. Section 3.1.6.4 – *Routing With WQv Removed* can be applied when generating the post development runoff hydrograph.

Water Quality

Water quality shall be evaluated based on Chapter 3 of the Georgia Stormwater Management Manual, Volume 2, with the following restrictions.

1. The target for water quality management shall be 80% removal of the Total Suspended Solids (TSS).
2. Commercial projects may require specific water quality controls to mitigate water quality issues known to be associated with specific development (i.e.: increased hydrocarbons associated with gas stations, increased floatables and trash associated with groceries stores, increased erosion associated with unimproved storage areas).
3. Table 3.1.2-1 – *Design Pollutant Removal Efficiencies For Structural Stormwater Controls* shall be used to establish the removal rates of the structures employed. Changes to these values due to site-specific variations to the standard designs shall be evaluated on a case-by-case basis.
4. Section 3.1.6.3 – *Calculations Of Pollutant Removal For Structural Controls In Series* shall be the method used to evaluate the removal efficiency of a system using more than one control.

Stormwater Report Requirements

This section contains the minimum requirements for submittal of reports related to the stormwater management for site development. All reports shall be prepared by a professional Engineer, Surveyor, or Landscape Architect registered in Georgia who has demonstrated competence through qualifications, education, experience, and licensing in the state of Georgia {O.C.G.A. 12-7-4 (b)}. Each report should be signed and sealed by the report preparer.

I. Narrative:

This section shall give general information about the project and the intended method for managing the stormwater. This section shall contain the following information as a minimum:

1. The name of the project.
2. Revisions to the report including date and description of the revision
3. Reference to the current construction drawings prepared for the site.
4. A description of the design approach and methodology used for calculation including any computer program used.
5. A list of design criteria and values used for the calculations including but not limited to the following:
 - a. Roughness coefficients
 - b. Runoff-coefficients (C or CN used supported with weighting calculations, coverage assumptions, and the like).
 - c. Soil types
 - d. Site slopes
 - e. Time of concentration (general for pipe design and specific for detention calculations)
 - f. Design storm used (inches/hour)
6. A description of the general topography and points of outfall from the project.
7. A description/discussion of known or suspected drainage concerns in the basin and/or outfall and how these concerns are addressed with the development.
8. A description of the downstream conveyances and statement of capacity.

II. Water Quantity

This section shall detail the design of the stormwater conveyances and any stormwater management facilities proposed for the project. The report shall include the following information as a minimum:

1. A map showing and labeling the stormwater conveyances and the stormwater management facilities. The map shall also delineate and label the individual drainage basins used to calculate the stormwater peaks for each stormwater conveyance and stormwater management facility.
2. Calculations for peak flows and conveyance capacities. If a program is used to perform the calculations, then an example calculation should be included.
3. An organized summation table/chart/narrative illustrating the procession of flows through the system, for stormwater drainage systems that are networked.
4. Pond routing data including the pond elevation vs. storage information, the outlet structure information, and elevation vs. outflow results.
5. The results of the design storm routing including peak water surface elevations and volumes required.
6. Emergency overflow calculations if required.
7. A discussion of the results of the routing.
8. A summary comparison of the pre-development vs. post-development flows at each point of discharge from the project.

III. Water Quality:

This section of the report shall detail the measures planned for the site to accommodate the site's requirements for stormwater quality. The report shall contain the following information as a minimum:

1. A narrative including the water quality requirements for the site.
2. A list of the water quality improvements planned for the site.
3. A tabular statement demonstrating that the plan meets the requirements for the site.



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David B. Andrews, P.E.
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The table below is a summary of the required minimum cover heights for each type of pipe.

Pipe Diameter (inches)	Minimum Cover (inches)			
	Traffic Bearing & Non-Bearing	Solid Pipe ¹	Air Chamber ^{1,2,3}	Perforated ^{1,2}
15	12	12	12	12
18	12	12	12	12
24	12	16	12	12
30	12	20	14	12
36	12	23	17	12
42	12	27	19	12
48	12	30	23	12
60	24	37	29	24

- (1) Water table assumed to be at ground surface, pipe is empty, the surrounding soil is saturated and the saturated weight of the backfill is 135 pcf.
- (2) Pipe must be wrapped with a filter fabric to prevent loss of fines around the pipe. If stone backfill (i.e. #57, #89) is used for backfill the filter fabric should wrap the entire trench (stone and pipe).
- (3) Air chamber pipe refers to pipe where the corrugation chambers are perforated while keeping the inner liner solid. Typically there are four holes per corrugation at 90 degree intervals with one set per outer corrugation.

Thank you for the opportunity to discuss an enhanced approval within Glynn County. The calculations provided are worst case scenarios. In our work throughout Florida we typically are approved with a minimum cover of 12 inches. Some believe that during times where high ground water tables exist, there will also be water within the pipe since the outfalls can easily be submerged. During your review, if you should need additional information please call.

Sincerely,

David B. Andrews, P.E.
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cc: Jay Robinson – ADS Sales Representative
Edwin Nuscher – ADS Sales Representative

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TABLE A