

Driveways that connect to the State Highway System must include drainage design that is functionally consistent with the drainage system of the highway. Drainage design for driveways should be consistent with the Georgia DOT [Drainage Manual for Highways](#), current edition.

The following sections will summarize the drainage requirements for driveways, but the designer should consult the GDOT Drainage Manual for details of drainage calculations and design methodology.

6A HYDROLOGY REPORTS

It is the responsibility of the applicant to provide appropriate drainage calculations and engineering design to prevent drainage problems arising due to increased runoff from developments. A hydrology report may be waived by the District Engineer or their designee for any commercial driveway permits, including subdivisions that are proposed to contain less than four (4) dwelling units.

Hydrology reports must be prepared under the supervision of an engineer registered in Georgia who must stamp and sign the report. The report must clearly show the drainage areas and the required runoff computations. A statement must be included that runoff conditions have been estimated in accordance with the GDOT Drainage Manual and that all drainage elements have been designed to accommodate the required discharge.

The general requirements of the hydrology reports are summarized in Table 6-1.

ITEM	NOTES
Runoff Calculations	Provide for each required storm frequency for both pre-developed and post-developed conditions.
Design of Structures	Provide design calculations for both inlet and outlet control.
Detention	If the post-developed discharge into the State Highway System is greater than pre-developed discharge, detention calculations must be provided.
Gutter Spread	Gutter spread calculations are required for the driveway if curb and gutter or header curb is used

TABLE 6-1 GENERAL REQUIREMENTS OF HYDROLOGY REPORTS

Separate drainage calculations must be provided for the pre-developed condition and for the proposed development. The report should clearly describe both conditions and give the area of each type of surface within the drainage area, including grassed, wooded, paved, etc. The runoff coefficients to be used in the calculations should be clearly stated.

The report should show the direction of runoff for both pre- and post-development conditions. The discharge points for each area must be provided.

The time of concentration should be given for each required storm frequency. The times for different types of flow (as outlined in DOT Drainage Manual) should be shown. Calculations shall be provided for all drainage structures for both inlet and outlet control. The calculations must be provided in report format and shall show the high water elevation above the inlet of the pipe or above the flow line of the grate.

6A-1 DRAINAGE AREAS

Drainage areas should be outlined on county maps, aerial photographs, US Geological Survey contour maps, or other specially prepared maps. For municipal-type construction, city maps or other specially prepared maps should be marked to show the boundaries of the total area contributing to the project. The direction of flow should be marked using arrows.

It is often necessary to determine elevations to accurately show flow directions in gutters and along paved parking areas.

The elevation or difference in height between the most remote point in the drainage area and the inlet flow line of the drainage structure must be shown. Similarly, the maximum length of travel that water must flow from the most remote point must be shown.

6A-2 RUNOFF DETERMINATION

The applicant's engineer should use the best method available for determining the storm runoff. For drainage areas up to 64 acres, (depending on the region) the rational method is recommended. For drainage areas greater in size, see GDOT Drainage Manual or USGS Publications: Flood-Frequency relations for urban streams and or techniques for estimating magnitude and frequency of floods in rural basins or Georgia. The drainage manual contains information that can be used to select the runoff coefficient based on the slope and surface of the drainage area and the soil type in the area. Methods for determining concentration times and rainfall intensity for certain storms and times of concentration are also provided in the drainage manual.

6B DRAINAGE DESIGN

Drainage design for driveways may include any or all of the following: on-site detention systems, drainage systems along the driveway, and connection to the highway drainage system.

6B-1 ON-SITE DETENTION SYSTEMS

When the rate of discharge from the proposed development to the State Highway System is less than the rate at which runoff was discharged prior to the development, then detention is not required. Any discharge that exceeds the amount of water by 1cfs at post development detention must be provided on the development site.

Detention ponds, if required, must be designed to accommodate the 2, 5, 10, 25, 50, & 100-year storm frequencies unless the local government has more stringent requirements.

The outlet structure of the detention pond must be designed to pass the 100-year storm flow without overtopping.

6B-2 DRIVEWAY DRAINAGE

Driveways should be designed with a low point prior to the connection with the State Highway so that surface flow will not run across the highway. However, in some cases this is not practical such as when the highway is in super elevation. In these instances, the design should minimize the surface flow into the highway. This may require grated inlets into driveway culverts when the drainage system involves ditches. For surface systems, the addition of catch basins may be necessary to minimize gutter spread. Under these conditions, a minimum of one set of catch basins will generally be required prior to the highway connection unless gutter spread calculations indicate the need for more. Drainage inlets or catch basins may not be placed in or directly adjacent to the radius.

Ditches along driveways must be designed to accommodate the 25-year storm. Ditches must be designed and constructed to minimize erosion in accordance with provisions of the latest Georgia DOT [Erosion Control Guidelines](#). If velocities exceed those permissible for grass lining, an alternate design must be used such as piping or paving the channel.

Side drain drainage systems along driveways must be designed for the 25-year storm. Curb inlets and grated inlets must accommodate the 10-year storm. The design must provide for inlets as needed to limit water spread to one-half of the outside travel lane.

6B-3 DISCHARGE INTO STATE HIGHWAY SYSTEM

The design calculations must address any component of the State Highway Drainage System that will receive additional discharge above the pre-developed condition. When pipes are connected to the highway system, the pipe as well as the junction box must be designed for the 50-year storm.

Any additional surface flows from the development that drain onto the highway must be accounted for in the hydrology report. The calculations must ensure that gutter spread in the post-development condition does not go beyond one-half of the outside lane.

6B-4 MISCELLANEOUS DESIGN REQUIREMENTS

All pipes 48" and larger must have an inlet and an outlet headwall. Only safety headwalls or those specifically approved by the District Engineer are allowed. All side drains up to 48" should have safety grate end treatments, unless located outside the clear zone or behind guardrail.

All cross drainpipes less than 48" located within the clear zone, as specified in the Road Design Guide, shall have safety inlets with grates.

In general, all structures that are to be extended should be extended in like kind, i.e. a box culvert with a box culvert. If special circumstances dictate otherwise, the applicant's engineer must demonstrate that the alternate design has equal or greater capacity than the existing structure.

If additional fill material is placed over an existing structure, it must be analyzed for strength to carry the additional load.

The following minimum sizes should be used for drainage structures on the State Highway System:

- Box Culverts – 4' x 4'
- Cross Drain and Side Drain Pipes – 18"

Minimum clearance over structures is 1' between the bottom of the sub grade to the exterior crown of the pipe.

Pipes should have a minimum clearance of 0.5' to any underground utility.

Pipe material used for commercial driveways within the right of way shall be concrete. HDPE may be used in accordance with the cross drain requirements for GDOT Construction Standard 1030P, if approved by the Area Engineer prior to construction.

Pipe material used for residential driveways within the right of way shall be corrugated metal pipe, concrete, or GDOT Std. 1030P HDPE if approved by the Area Engineer prior to construction.