Contact the area Maintenance office for existing drainage problems.

Visit the site to confirm initial site investigation. Request additional survey and update drainage areas as needed.

Determine future outfall locations.

- Perform initial design complete with grades as proposed grades are critical for drainage design.
- Create proposed drainage areas based on the proposed conditions and contours.
- Determine Tc time based on most hydrologically distant point.
- Spread is calculated using HEC-22 equations.
- Calculate inlet efficiency to determine bypass flow to downstream inlet.
- Check freeboard criteria in the RDM.

Obtain As-Built information of existing drainage facilities within the project area. DelDOT Gateway can be utilized to assist in locating existing drainage features.

- Request topographic survey.
- Prepare existing drainage area maps based on 2' foot contours stored on Y: Drive.
- Check existing cross section table on DelDOT Gateway to determine if a high water table or impact project drainage. If the project area has a high GWT, contact the Geotechnical Engineer.

- Request additional survey and update drainage areas as needed.
- Determine future outfall locations.
- Perform hydrologic analysis of the proposed drainage areas in accordance with the RDM, Hydrology requirements found in sections, and the requirements of the design frequency found in...

- Perform inlet spread is calculated using HEC-22 equations.
- Check freeboard criteria in the RDM.

- Calculate pipe material required based on guidance in RDM.
- Analyze conflict areas in accordance with the Utility Conflict Matrix found on the DRC.
- Prepare Drainage Report in accordance with the Drainage Submission Checklist found on the DRC.
- Request pipe video for any existing drainage facilities to remain in the proposed conditions.
- Replace functionally and structurally deficient features.

- Size drainage pipes in accordance with HEC-22 methodology and the RDM.
- Design any Road Design responsibility culverts in accordance with ROM, HEC-24 as well as the DNREC Erosion and Sediment Control Handbook.
- Check HGL and EGL in accordance with the RDM and HEC-22. Adjust closed drainage system as necessary.

- Update Drainage Report in accordance with the Drainage Submission Checklist found on the DRC.

- Verify comments made on the Preliminary Submissions’ Drainage Report.

- Design any Road Design responsibility culverts in accordance with ROM, HEC-24 as well as the DNREC Erosion and Sediment Control Handbook.
- Check HGL and EGL in accordance with the RDM and HEC-22. Adjust closed drainage system as necessary.

- Update Drainage Report in accordance with the Drainage Submission Checklist found on the DRC.

Reference Material Links:

- FHWA Drainage Publications Listing
- HDS 2 – Highway Hydrology Second Edition
- DelDOT Road Design Manual
- HDS 4 – Introduction to Highway Hydraulics
- HDS 5 – Hydraulic Design of Highway Culverts
- DelDOT Road Design Manual, Chapter 6
- HEC 14 – Hydraulic Design of Energy Dissipators for Culverts and Channels
- DelDOT Road Design Manual
- DNREC Sediment and Erosion Control Handbook
- HEC 22 – Urban Drainage Design Manual
- HEC 15 – Design of Roadside Channels with Flexible Linings

Workflow for Drainage Design on a Transportation Solutions Project