

Chapter 4: Plan Requirements

4.1 Introduction

This chapter provides information on Grading, Drainage and Erosion Control (GDEC) plans, stormwater concept plans, stormwater As-Built plans and digital plan submission requirements. The requirements for sinkhole and drainage wells and the requirements for other agencies are also briefly discussed.

A copy of any Federal, State or County permits or permit applications must be submitted with the plans or at the time of the pre-construction meeting. As permits, permit applications, letters of acceptance, or other permit documentation are received, copies must be submitted to the Montgomery County Building and Codes Department, Stormwater Program Office.

All required plan GDEC and submittal fees must be paid at the time of plan submission. Plans will not be accepted for review without the completed form and payment of fees.

4.2 GDEC Plan Minimum Requirements

For site disturbances of less than 5 acres, at least two separate EPSC plan sheets shall be developed. At least two stages shall be identified, with associated EPSC measures addressed. The plan stages shall be addressed separately in plan sheets, with each stage reflecting the conditions and EPSC measures necessary to manage stormwater runoff, erosion and sediment during the initial land disturbance (initial grading) and the conditions and EPSC measures necessary to manage stormwater, erosion and sediment at final grading.

For site disturbances of more than 5 acres, at least 3 separate EPSC plan sheets shall be developed. Three stages shall be identified. The first plan sheet should reflect the conditions and EPSC measures necessary to manage stormwater runoff, during the initial land disturbance (initial grading). The second plan sheet shall reflect the conditions and the EPSC measures necessary to manage stormwater runoff from interim land disturbance activities. The third plan sheet shall reflect the conditions and EPSC measures necessary to manage stormwater runoff, erosion and sediment at final grading.

The EPSC plan shall accurately describe the potential for soil erosion and sedimentation problems resulting from land disturbing activity and shall explain and illustrate the measures that are to be taken to control these problems during each phase of construction. The length and complexity of the plan is to be commensurate with the size of the project, severity of the site conditions, and potential for off-site damage. The plan shall conform to the requirements found in the TDEC Tennessee Erosion and Sediment Control Handbook, and the TDEC Manual for Post Construction. All plans will be submitted electronically in PDF format, and shall include at least the following:

1. A complete plan of the proposed project at a scale of no less than 1" = 100' (one inch equals one hundred feet).

2. There must be a location map included showing the relative location of the property, existing property boundaries for the plan parcels and all adjacent properties, and the Tax Map and Parcel Number of all plan parcels.
3. All existing and proposed buildings on the site must be shown, with the associated finished floor elevations.
4. Existing and proposed site contours must be shown at two (2) foot vertical intervals.
5. Plans must show existing and proposed impervious surfaces (this includes engineered pervious surfaces)
6. Plans must show all existing and proposed stormwater management structures on and in the immediate vicinity of the property, and must include material of construction, size, type, slope, capacity and inlet and invert elevation of the structures, as applicable. Off site structures may be shown on a vicinity map at a scale of 1" (one inch) = 2000' (two thousand feet). The relevant data for these structures must be provided in tabular format, also.
7. There must be at least one benchmark located on the plans with the correct elevation listed (horizontal datum NAD83 and vertical datum NAVD88 to be used exclusively).
8. The construction entrance must be shown on the plans and a detail drawing included in the plans.
9. Temporary erosion and sediment control measures to be implemented during construction must be displayed and detail drawings included of proper installation methods.
10. Final stabilization measures proposed for all disturbed areas, including, but not limited to: ditches, swales, channels, detention/retention facilities, sinkholes, and areas of excavation or fill. Supporting documentation, such as engineering calculations and construction details for final site stabilization measures must be provided.
11. All existing and proposed flood hazard areas, floodplain and floodway boundaries and associated elevations must be marked. All stormwater detention facilities shall have the 100 year flood elevation indicated. In areas outside flood zones, stormwater detention facilities must show the maximum level resulting from a 100 year storm event.
12. All proposed drainage easements must be shown. Easements are required at all points where runoff from two or more properties combine.
13. Construction detail drawings must be included that show all stormwater structures (i.e.: swales, ditches, inlets, head walls, detention or retention ponds, overflows, emergency spillways, dewatering devices, sediment ponds, sinkholes, class V injection wells, existing water supply wells, erosion control measures, temporary and permanent erosion control measures, etc).

14. Delineation of water quality buffers around streams, waterbodies and wetlands. Plan notes will include the method of buffer protection during construction activities.
15. All environmentally sensitive areas will be clearly delineated. Plan notes will include the method of protection during construction activities.
16. Subdivision plans should include typical roadway pavement section and plan and profile of proposed roadways.
17. **Building lots with more than 12 inches fill material where structures will be located must be listed and clearly identified on the plan.** Soil compaction tests are to be submitted to the Montgomery County Stormwater Program before building permits will be issued. The compaction should be measured for every 12 inch lift of fill, and compaction should be to a minimum of 95% Modified Proctor. Requirements for fill material and soil compaction standards can be found in section 1803.5, "Compacted Fill Material" of the 2003 International Building Codes. **Failure to provide compaction test results may result in the imposition of additional engineering and/or geophysical testing requirements before either a building permit or Certificate of Occupancy will be issued.** Compaction certification waivers are available for special circumstances.
18. A summary of all hydrologic and hydraulic calculations for appropriate design storms must be submitted. Calculations shall include, but not be limited to, curb and gutter sections, inlets, pipes, culverts, bridges, and ditches.
19. All stormwater quantity detention pond design calculations including inflow and outflow hydrographs, storage computations, and details of all outlet works including any spillway or overflow structures.
20. Sinkhole and/or drainage well design calculations including inflow and outflow hydrographs, storage computations, and details of all outlet works including any spillway or overflow structures.
21. Floodplain areas require the following information: existing and proposed floodplain and floodway boundaries, floodplain elevations and lowest floor elevations for buildings in the floodplain, and cut and fill cross sections and volume calculations. Hydraulic calculations shall be submitted, as appropriate.
22. A stormwater pollution prevention plan (SWPPP), which shall be written in accordance with requirements as found in the TDEC Erosion and Sediment Control Manual Appendix A. Information required in the SWPPP for the development includes, but is not limited to:
 - a) Locations of construction vehicle parking and maintenance areas
 - b) Location(s) of concrete truck washout areas and vehicle exit washout areas

- c) Location(s) of chemical storage areas and identification of the chemicals that will potentially be stored on-site
- d) Location(s) of construction materials and debris storage areas
- e) Location(s) of areas where construction debris will be buried

Note: None of these locations shall be in flood zones for rivers, streams and/or sinkholes, or within any water quality buffer zone. Show these locations on the grading, drainage and erosion control plans.

- 23. All caves, sinkholes, class V injection wells and other karst features must be shown. Water quality buffers associated with these structures must be shown. Known sinkhole open throats, injection well standpipes, riprap installations and areas with rock fill must be shown in detail on all plans.
- 24. All plans must be stamped by a professional (engineer, architect or surveyor) registered to practice in the State of Tennessee.

Some requirements will not be applicable to all plans. Omission of any of the heretofore mentioned requirements that are applicable for detailed plans and calculations shall deem the plans as being incomplete, and shall be returned to the Developer, or designated Engineer, for completion before review.

The Final Grading and Drainage plan requirements are the same as those listed for the EPSC plan. The Final Grading and Drainage plan is intended to show the completed and stabilized post construction site with all temporary EPSC measures removed. The Final Grading and Drainage plan shall conform to the requirements found in the TDEC Manual for Post Construction in addition to those in the Montgomery County Stormwater Management Manual. The Drainage plan must also include:

- 1. Proposed stabilization schedule and final landscaping plan
- 2. All permanent stormwater control structures
- 3. All post construction water quality BMPs

4.3 GDEC Digital Plan Submission Requirements

GDEC plans submitted digitally must meet the requirements of Section 4.2 at a minimum.

Each GDEC digital plan submission shall include a layer index and description of layers in a text file that describes the data being submitted and explains any data contained in any of the layers named "other". Drawings shall be properly annotated on separate layers. All lines must be solid, continuous, and snapped at all intersections. No lines shall be broken by text; all

annotation must be located above or below the line work. All point features must be true points (not just line symbology). However, additional symbology may be included as well. Digital plan submittals for new developments and redevelopments must:

1. Be oriented north, georeferenced to Tennessee State Plane Coordinates, North American Datum 1983 and vertical datum NAVD88, with map units in US Survey Feet
2. Provide control points, properly labeled
3. Provide layers for each distinct data type, properly named
4. Provide lines that are solid, continuous, and snapped at all intersections
5. Provide annotation located above or below the line, point, or polygon
6. Provide point features as true points (symbology may be used along with a true point)

Digital submittals must be presented to the Montgomery County Building and Codes Department using the following:

- Email (preferred)
- CD-ROM
- DVD ROM
- USB Portable Data Storage Unit

GDEC digital submittals presented to the Montgomery County Building and Codes Department using media other than those listed above will not be accepted. All digital media submitted becomes the property of Montgomery County Building and Codes Department. A digital submittal not compatible with the formats listed will be disapproved.

The following file formats will be accepted:

***.shp (ArcView shapefile, preferred format)**

*.tif (Georeferenced Drawing Image)

*.pdf (Adobe format)

4.4 Stormwater As-Built Plan Requirements

As new development or redevelopment construction is completed, an "as built" plan, certified by a licensed professional engineer and/or surveyor must be submitted upon completion of the

stormwater management facilities that were included in the stormwater management plan and/or Grading Drainage and Erosion Control (GDEC) plan. The licensed professional shall certify that:

- a) The facilities have been constructed as shown on the "as-built" plan, and facilities meet the approved stormwater management plan and specifications, or
- b) The facilities achieve the function for which they were designed.

Submission of the stormwater as-built plans is required before subdivision or site plans final plans are approved. The as-built plans will be compared to the approved stormwater management plan for any irregularities or non-conformance with the approved plans. The as-built drawings shall reflect the “as-constructed” condition of the development, and shall include sufficient information to demonstrate conformance with the approved stormwater management plan. Significant unreported deviations from the approved plan shall be considered violations of the Montgomery County Resolution and are grounds for withholding the release of a bond pending the completion of corrective action(s), and/or requiring the submittal of a revised stormwater management plan.

Stormwater As-built plans must be prepared and stamped by the appropriate design professional as required to stamp the original stormwater plan, and/or registered land surveyor licensed to practice in the State of Tennessee. The plans must be submitted as a PDF or TIF file..

Each digital stormwater as-built plan submission shall include a layer index and description of layers in a text file that describes the data being submitted and explains any data contained in any of the layers named “other”. Drawings shall be properly annotated on separate layers. All lines must be solid, continuous, and snapped at all intersections. No lines shall be broken by text; all annotation must be located above or below the line work. All point features must be true points (not just line symbology). However, additional symbology may be included as well. Digital submittals for new developments and redevelopments must:

1. Be oriented north, georeferenced to Tennessee State Plane Coordinates, North American Datum 1983 and vertical datum NAVD88, with map units in US Survey Feet
2. Provide control points, properly labeled
3. Provide layers for each distinct data type, properly named
4. Provide lines that are solid, continuous, and snapped at all intersections
5. Provide annotation located above or below the line, point, or polygon
6. Provide point features as true points (symbology may be used along with a true point)

Digital as-built submittals must be presented to the Montgomery County Building and Codes Department using the following media:

- Email (preferred)
- CD-ROM
- DVD ROM
- USB Portable Data Storage Unit

Digital as-built plan submittals presented to the Montgomery County Building and Codes Department using media other than those listed above will not be accepted. A digital as-built submittal not compatible with the formats listed will be disapproved.

The following file formats will be accepted:

***.pdf (Preferred)**

***.shp (ArcView shapefile)**

Other Requirements:

Digital stormwater as-built plans will include of all stormwater control facilities and structures (including but not limited to, riprap aprons, swales, ditches, rock check dams, detention and retention basins, wetland areas, bio-retention and remediation areas, easements, water quality buffers, sinkholes and class V injection wells, headwalls, pipes, culverts), and will provide the following data for each structure or facility:

- a) Actual topographic elevation of pond(s) or basins rims and bottoms (including what will be underwater), shapes and volumes, and indication of the 100 year flood elevation or 100 year storm storage volume as appropriate
- b) Location, construction material, size, elevations and inverts of all outlet structures, drainage controls and dewatering devices (both inlet and outlet, if applicable)
- c) Actual bench mark location, with the correct elevation and description
- d) Headwall type, location, and material, including any energy dissipation measures installed
- e) Pipe and Culvert Information (material, length, size, slope, inlet and outlet locations and inverts)
- f) Inlet Information (location, type, material, rim elevations, and structural inverts)
- g) Ditch and swale cross section, measurements, and locations

- h) Spillway and weir cross sections
- i) Sinkhole and/or drainage well location and design details including any spillway or overflow structures
- j) Permanent erosion control and water quality measures

One (1) complete copy of the flat plat that is to be recorded at Register of Deeds must be included with the digital as-built plans.

4.5 Stormwater Concept Plans

Any project that disturbs more than 10,000 square feet, but less than one-half (½) acre must submit a stormwater concept plan to Montgomery County Building and Codes Department, Stormwater Program Office for review and approval. A stormwater concept plan is a preliminary plan for a proposed project that presents a concept of how the site will be developed and how stormwater will be handled by the drainage system. The purpose of the stormwater concept plan is to review the stormwater management requirements so that the project will not create problems for existing properties and infrastructure.

A stormwater concept plan is a preliminary plan of the proposed development with the following inclusions and/or requirements:

1. A map showing the area proposed for development in plan view. The map base may be a USGS 7.5 minute quadrangle, a map of local data that includes similar features (streams, topography, streets, and buildings or parcels), or a FEMA flood insurance rate map (FIRM) or flood hazard boundary map (FHBM).
2. Existing floodplain and floodway boundaries, if applicable.
3. Arrows indicating the existing and proposed direction(s) of stormwater runoff on the site.
4. The existing and proposed (conceptual) stormwater drainage systems including ditches, streams, inlets, curb and gutters, detention/retention facilities, stormwater quality BMPs, storm sewers, culverts, bridges, and sinkholes.

Stormwater concept plans do not need to be prepared by a registered professional unless the project complexity, hazards to the environment or infrastructure alteration require professional design.

Proposed and existing detention/retention facilities, stormwater quality BMPs, and sinkholes must be included on all concept plans.

Stormwater concept plans must be submitted to the Montgomery County Building and Codes Department, Stormwater Program Office for review and approval. The Stormwater Coordinator

will review the plan within 15 business days of receipt. The concept plan review is mandatory and will be used to determine if a proposed project qualifies for any exemptions and to determine if complete Grading Drainage and Erosion Control plans or specific environmental safeguards will be required. The Stormwater Coordinator will approve the concept plan, approve the concept plan with changes, or reject the concept plan. If the plan is rejected, the Stormwater Coordinator will identify changes, additional analysis, or other information needed to approve the plan on resubmittal.

4.6 Karst Feature Notes

Any closed depression found in karstic topological regions is a sinkhole. The sinkhole rim is the area defined by the highest closed contour of the structure. All sinkholes are stormwater structures regulated by the Montgomery County Stormwater Resolution.

In some areas, the presence of sinkholes is very evident, and in other areas sinkholes are not easily identified. Natural, gradual depressions can indicate the presence of a sinkhole and contractors, builders and landowners should be aware of regulations and policies that may apply, if the depression turns out to be a sinkhole.

In all cases, Grading, Drainage and Erosion Control (GDEC) plans submitted for review to the Montgomery County Building and Codes Department must show all sinkholes and associated water quality buffer zones. The buffer will be measured from the highest closed contour surrounding each sinkhole. In cases where the area of a sinkhole is not well defined, the Montgomery County Building and Codes Department will determine the extent of the water quality buffer, based on best professional judgment.

A **Class V Injection Well** (also: Class 5 Injection Well or Injection Well) is a drainage well or improved sinkhole used to drain surface water, primarily stormwater runoff, into a subsurface formation. The extent of a class V injection well is defined by the entire area enclosed by the outer rim (the highest closed contour of the depression). Injection wells are permitted by TDEC, and are stormwater structures regulated by the Montgomery County Stormwater Resolution.

Injection wells are generally designed to allow large amounts of runoff to be drained into subsurface formations. The most common design involves a standpipe with holes at regular intervals, which allows the runoff to flow down and out. The standpipe is surrounded by graded rock fill and the sinkhole is lined with geotextile material. Properly constructed, the water path is limited to the standpipe, preventing water erosion of the limestone formation and further dissolution of the limestone substrate.

Caves are formed in karstic areas by the same material dissolution and collapse process that results in sinkholes. A cave provides direct access to subsurface formations, and has the same potential for pollution of groundwater as sinkholes. Caves are stormwater structures regulated by the Montgomery County Stormwater Resolution. The same water quality buffer requirements that are applied to sinkholes are also required for caves.

In all cases, GDEC plans submitted for review to the Montgomery County Building and Codes Department must show all known or suspected caves and the associated water quality buffer zone. The buffer will be measured from the highest closed contour surrounding each cave entrance. In cases where the area is not well defined, the Stormwater Coordinator will determine the extent of the water quality buffer, using his or her best professional judgment.

Please see the **Montgomery County, TN. Karst Feature Policy** document for full details and requirements concerning sinkholes, injections wells and other karst features.

4.7 Plans Review and Approval

Stormwater Concept plans, GDEC plans and Water Quality plans will be reviewed by the Stormwater Program staff. Problems or deficiencies will result in notification of the designing engineer or architect that the plan was rejected and the reasons for that rejection.

The notification of either the rejection or approval of submitted plans will be made by certified letter. Notification can also be made by email or phone, if this is requested in advance by the designing engineer or architect.

Once the plans have been approved, a pre-construction meeting is required. The purpose of the pre-construction meeting is to discuss the requirements of the Stormwater Resolution and any related issues. The pre-construction meeting will cover:

- 1.) The anticipated construction schedule indicating the proposed construction milestones and staging. The construction schedule must include, at a minimum, the proposed months or seasons for the following activities:
 - a) Installation of erosion control
 - b) Establishment and field delineation of water quality buffer protection areas
 - c) Initial site inspection by the Stormwater Inspector
 - d) Site clearing and grubbing
 - e) Site grading and excavation
 - f) Slope stabilization
 - g) Installation of storm drainage systems
 - h) Establishment of permanent vegetative cover
 - i) Final site inspection by the Stormwater Inspector
 - j) Dust control

- 2.) Montgomery County EPSC requirements and contractor/developer responsibilities
- 3.) Any site specific information or issues

It is required for the following people to be at the pre-construction meeting:

- 1) The Developer
- 2) Land Owner (if different from the developer)
- 2) The Engineer or Architect
- 3) The Grading Contractor
- 4) The Stormwater Contact Person for the Project

All of the above listed parties will be required to sign a form stating that they agree to and understand all the Erosion Control and Sediment Prevention requirements for development in Montgomery County.

It is the responsibility of the permit applicant to schedule the pre-construction meeting with the Montgomery County Building and Codes Department. Failure to conduct a pre-construction meeting before beginning land-disturbing activities at the site can subject the developer to enforcement action. *A grading and/or stormwater quality permit will not be issued without first having a pre-construction meeting.*

4.8 Plan Revisions

Should design or installation changes occur prior to or during construction, project plans shall be appropriately revised and resubmitted. The resubmission shall include a letter stating why such changes are believed necessary. The Montgomery County Building and Codes Department reserves the right to waive this requirement or to re-review the entire set of plans if the plans are changed. The changes must be included in the as-built plans submitted at the end of the project.

4.9 Grading and Stormwater Quality Plan Limitations

A grading permit issued pursuant to this section shall be construed to be a license to proceed with the work and shall not be construed as authority to violate, cancel, alter, or set aside any of the provisions of these regulations, nor shall issuance of a permit prevent the Montgomery County Building and Codes Department from thereafter requiring a correction of errors in plans or in construction or of violations of these regulations. A person, firm, or corporation required to obtain a grading permit in compliance with these regulations must do so prior to commencing any work pertaining to the permit. Corrective measures including but not limited to stop work orders, penalties, and injunctions may be taken as required to enforce the terms of this requirement.

Work authorized by a grading and/or stormwater quality permit must be commenced within six (6) months following the date the permit was issued or the permit(s) shall become invalid and a new permit shall be required. If the work authorized by such permit(s) is not completed within twelve (12) months from the date of issuance, the permit(s) shall be invalid. However, for just and reasonable cause, up to two extensions for periods not exceeding six (6) months each may be allowed. Extension requests must be submitted to the Montgomery County Building and Codes Department in writing prior to the permit expiration date. Additional extension requests will require justification in writing to the Montgomery County Building and Codes Department and may not be automatically granted. Authorizations for extensions will be given in writing.

A grading or stormwater quality permit issued by the Montgomery County Building and Codes Department does not relieve the applicant of responsibility for obtaining any permits required by the U.S. Army Corps of Engineers, Tennessee Department of Environment and Conservation, the U.S. Environmental Protection Agency, or other state or federal agencies.

Montgomery County is a National Flood Insurance Program participant and therefore has the authority to approve or disapprove activities in the floodplain of streams and rivers within the County's jurisdiction. Work within the stream or river channel requires authorization from the US Army Corps of Engineers, TDEC and the County.

4.10 Flood Elevation Certification

For any new or substantially improved structure that is subject to minimum floor elevation requirements under these or other regulations, a registered engineer and/or registered land surveyor must certify the lowest floor elevation (including basement); or if the structure has been flood-proofed, the elevation to which the structure was flood-proofed. The certification must be provided to the Montgomery County Building and Codes Department on a FEMA Elevation Certificate.

4.11 Requirements of Other Agencies

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable water of the United States unless the work has been previously authorized by a Department of the Army permit. The construction of outfalls, stormwater management outlets, or other structures below ordinary high water of any navigable water will require a Department of the Army permit prior to construction.

Section 301 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States unless the work has been previously authorized by a permit pursuant to Section 404 of the same Act. Placement of dredged or fill material below ordinary high water of any water in conjunction with stormwater management improvements (e.g., channel realignments, concrete slope paving) will require a Department of the Army permit prior to construction. The placement of dredged or fill material or any grading activities within a wetland must also be in compliance with section 404.

If a Department of the Army permit is required, sixty (60) days or more may be required for permit processing. Depending on the nature and location of the work, it is possible that the work has been previously approved under authority of the Nationwide Permit and individual processing would not be required.

In accordance with the Tennessee Water Quality Control Act, TCA 69-3-108, any activity which alters the course or physical character of a stream, defined by a blue line on a 7 1/2 minute United States Geological Survey (USGS) quadrangle, requires an Aquatic Resource Alteration Permit (ARAP) from the Division of Water Pollution Control. This permit is required for activities such as stream alteration, stream enlargement, dredging, and diversions in box culverts.

Section 405 of the Water Quality Act of 1987 (WCA) added section 402(p) of the Clean Water Act (CWA) to require the Environmental Protection Agency (EPA) to establish regulations setting forth National Pollutant Discharge Elimination (NPDES) permit application requirements. Projects must be designed with sensitivity to stormwater quality issues and must comply with Section 405 as administered by the Division of Water Pollution Control.

The Division of Water Supply is the primary regulatory agency for injection wells including sinkholes. A sinkhole is considered an injection well under the Underground Injection Control (UIC) regulations. A UIC permit may be required for alterations to a sinkhole or alterations to any land in the contributing drainage area to a sinkhole.