

**DEVELOPMENT ENGINEERING DIVISION
GENERIC/SPECIFIC SITE DEVELOPMENT PLAN CHECKLIST
INDIVIDUAL LOT – RESIDENTIAL (following subdivision)**

I. SUBMISSION DOCUMENTS

- A. Retaining Wall Computations, Plans w/Sections, Details, Profiles
- B. Stormwater Management Computations
- C. Geotechnical Report for Stormwater Management/Retaining Walls
- D. Noise Mitigation identified and included on plan
- E. Design Manual Waiver Request
- F. Letter of Permission for Offsite Disturbance

II. GENERAL INFORMATION

- A. Standard title and signature blocks (ALL SHEETS)
 - 1. Owner/Developer name, address, and phone number
 - 2. Design Professional name, address, phone number, seal, signature, date
 - 3. Project name, zoning, tax map, election district, street address, parcel no.
 - 4. Permit, file reference numbers, water & sewer contract numbers, etc
- B. Vicinity map requirements (COVER SHEET)
 - 1. Scale 1" = 2000' north arrow shown
 - 2. ADC Map Coordinates
 - 3. Two (2) Howard County Geodetic Coordinates shown and labeled
 - 4. Site delineated
- C. Notes and Information (COVER SHEET)
 - 1. Howard County Standard General Notes for Sketch Plans
 - 2. Site Analysis Data Sheet
 - 3. Legend
 - 4. Sheet Index
- D. General sheet information (ALL SHEETS)
 - 1. Plan scale 1" = 10' to 1" = 50'
 - 2. Profile scale 1" = 5' vertical, 1" = 50' horizontal
 - 3. Minimum three (3) grid ticks on plan sheets
 - 4. North Arrow
 - 5. Match lines labeled and referenced
 - 6. Profiles, details and cross-sections drawn to scale
 - 7. Design Professional's seal, signature and date
 - 8. Sheets numbered

III. SITE DEVELOPMENT PLAN

- A. Site information required
 - 1. Layout with appropriate boundary information
 - 2. Adjacent right-of-ways, street names, centerline stationing, street classification shown
 - 3. Adjacent property owner information
 - 4. Existing and proposed easements shown and labeled with recording references
- B. Topographic information
 - 1. Existing onsite and offsite contours labeled (at no greater an interval than 2") based on conditions of final plan (**Howard County GIS shall NOT be used**)
 - 2. Show proposed buildings and existing buildings to remain or raised
 - 3. Show water, sewer, storm drainage, water and sewer house connections and permanent pond locations and type as existing features including easements
- C. Proposed Grading
 - 1. Proposed contours shown (at no greater an interval than 2')
 - 2. Generic/specific house types for each lot identified
 - 3. Spot elevations at building corners, driveways, grade breaks, P.C.'s, P.T.'s etc. to adequately portray site grading
 - 4. Label the meter location
 - 5. Fire hydrants shown and labeled
 - 6. Dimension utilities and check for conflicts
- D. Utility Information
 - 1. Label all existing and proposed storm drain pipes and structures
 - 2. Show public water and sewer mains on-site (with easements)
 - 3. Show and label existing and proposed WHC and SHC
 - 4. Label the meter location
 - 5. Fire hydrants shown and labeled
 - 6. Dimension utilities and check for conflicts
- E. Site Improvements
 - 1. Check driveway sight distance and corner clearance were appropriate in accordance with Design Manual, Volume III
 - 2. Check lot grading in accordance with Design Manual, Volume I
 - 3. Applicable apron detail denoted. Use-in-common driveway construction notes and paving detail
 - 4. Note minimum sewer service elevation (from water and sewer contract drawings) and proposed first floor and cellar elevations
 - 5. Noise mitigation shown and details provided w/associated easements
- F. General Requirements
 - 1. Provide a defined swale along property line for back-to-back lots
 - 2. Provide a minimum slope of 1% (a 2% slope is desirable) for each sewer house connection

3. Driveway slopes shall be no greater than 14% unless approved by DED
4. Minimum gradient for concrete or other impervious surfaces shall be 1/16" per foot (0.5%) Minimum gradient for pervious surfaces shall be ¼% per foot (2%)
5. Maximum gradient shall be 2-1/2" per foot (21%) for a minimum of 4 ft away from all building walls, except where restricted by property lines

IV. RETAINING WALLS

A. General items to include:

1. Retaining walls greater than 3' in height measured from finished grade to the front to the top of the wall shall require structural design
2. Grades shall not exceed 2:1 above the wall or 4:1 below the wall within the maintenance easement
3. Horizontal dimensions measured from bottom face of the wall at the proposed grade
4. Retaining walls shall not be constructed on fill materials
5. Retaining walls & supports shall not be within a Howard County right-of-way or easement
6. Computations signed and sealed by the appropriate design professional

B. Construction Drawings – Plan View:

1. Retaining walls in plan view at a maximum scale of 1" = 50'
2. Grading around the retaining wall showing flow patterns around the wall
3. Grading around the wall shall show spot elevations every 50' along the length of the wall at the top and bottom of the wall
4. Flow arrows along the top of the wall indicating drainage patterns
5. Sheet flow approaching wall
6. Provide scour protection for runoff that cascades over the wall
7. Walls less than 10' in height, 10' wide construction easement is required from the face of the wall
8. For all walls the width of easement shall be equivalent to height of wall plus one-half the wall height
9. Easement clear of floodplains, buffers, wetlands, property boundaries, structures, utility easements, environmentally sensitive areas
10. No structures or underground utilities within the maintenance easement
11. Global stability analysis for walls 10' in height or greater
12. "NO TREE PLANTING ZONE" for all block or timber walls identified
13. Maintenance easement shall not encroach on the building envelope of any residential lot

C. Construction drawings – elevations:

1. Elevations for all walls at a scale not to exceed 1" = 5' (1" = 10' horizontal for walls over 50' long) Provide a vertical scale bar and horizontal stationing across the bottom of the elevation
2. Front view shall have typical section identified by a letter or number
3. Section breaks clearly identified
4. Element of the elevation shall include:
 - a. Complete outline of the wall
 - b. Finished grade line superimposed over the wall at top and bottom

- c. Locations of weep holes (40' on center or as required by Geotechnical Engineer)
 - d. Location of all utilities in proximity to the walls shown
 - e. Proposed geogrid arrangement location and length
 - f. Vertical placement of geogrid identified
 - g. Required allowable bearing strength for each typical section indicated
 - h. Dimension typical section maximum height allowed
- D. Construction Drawings – cross sections:
- 1. Typical cross section for each wall as it varies by height and geogrid placement and/or other significant design features. Maximum scale 1" = 5'
 - 2. Typical section maximum height of wall
 - 3. Graphically show the number of blocks or timbers vertically placed
 - 4. Typical reinforcement for reinforced concrete walls
 - 5. Design notes for reinforced concrete walls including spacing requirements
 - 6. Indicate the slope above and below the wall
 - 7. Bearing strength required for soil beneath the wall on each typical section
 - 8. Drain placement behind the base of the wall shown, details, fabric replacement
 - 9. Geogrid placement by layers and length show in cross section detail
- E. Construction drawings – fences/guardrails/details
- 1. Fence for all retaining walls 30" in height or greater along the entire length
 - 2. Fences shall be a minimum of 36" in height, openings less than 4" in width
 - 3. Fences shall withstand 200 lbs loading applied horizontally at any point
 - 4. Typical fence footing detail provided
 - 5. If fence is setback from the wall, ends shall be tapered to prevent access
 - 6. Fences shall be shown in plan view
 - 7. Walls in proximity to vehicular traffic require guard rails
 - 8. For driveways, edge shall be a minimum 2' in front of guard rail or wall
 - 9. Face of guardrail shall be a minimum 3' from face at the top of the wall to the side of the guardrail facing the wall
- F. Design calculation/failure analysis
- 1. Computations shall contain a failure analysis meeting the following factors of safety:
 - a. 2.0 for sliding failure (1.5 for manufactured block)
 - b. 2.0 for overturning failure
 - c. 2.0 for bearing failure for concrete or timber walls
 - d. 3.0 for bearing failure for concrete walls
 - 2. Failure analysis shall contain likely or anticipated surcharge loads
 - 3. for manufactured block walls, supplemental design booklets may be substituted for failure analysis but shall not be considered a part of the construction drawings
 - 4. Provide a complete set of design calculations, including the placement and spacing of steel reinforcement for reinforced concrete walls

G. Construction drawings required notes:

1. On all retaining walls General Notes include the following:
 - a. Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL or equivalent) certified soils technician
 - b. The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified spoils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP-399
 - c. The suitability of fill material shall be confirmed by the onsite soils technician. Each eight (8) inch lift shall be compacted to a minimum of 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of construction
 - d. For “CRITICAL” walls, one soil boring shall be required every 100’ along the entire length of the wall Copies of all boring reports shall be provided to the Howard County Inspector prior to the start of construction
 - e. If no surcharge loads are considered add a note to the cross section details stating “THIS WALL NOT DESIGNED FOR SURCHARGE LOADS”

H. Tiered Walls

1. Tiered walls 10’ high or greater shall be designed “CRITICAL” walls
2. Setback between walls shall be equal to the height of the lower wall or greater
3. Slope between tiered walls shall not exceed 4:1

V. STORMWATER MANAGEMENT (ESD to the MEP)

NOTE: Other Agencies reserve the right to enforce more stringent criteria and should therefore be consulted as to their additional requirements. The more restrictive criteria shall govern.

A. Report Submission

1. Job Title
 - a. Job Name
 - b. Owner
 - c. Design Professional
 - d. Date Prepared
 - e. Seal, Signature and Professional Certification
2. Table of Contents
 - a. Sections listed
 - b. Appendix listed
 - c. Figures & Tables listed
3. Narrative
 - a. Introduction – gives overview of what is contained in report
 - b. Field Investigation – gives overview of findings of design professional from site visit prior to starting design. Includes narratives on drainage areas, time of concentration paths, ground cover, downstream hazards, soil investigations, etc.
 - c. General site information (i.e., acreage, zoning, locations, slopes, soils, vegetation, average conditions, variances, restrictions, etc.)

- d. Impervious cover information (existing and proposed)
- e. Site specific information
 - 1) Justification for type of ESD to the MEP practices used
 - 2) Provide narrative in response to each of the Performance Standards defined in the MDE SWM Design Manual, Vol. I (as applicable)
 - 3) Define facility ownership (ESD Practices)
 - 4) Methodology/analysis used for design (reference all assumptions)
 - 5) WQv, Rev and/or ESDv requirements/analysis (as applicable assumptions)
 - 6) Quantity requirements/analysis
 - 7) Facility summary (ESD Practices)
 - 8) Erosion sedimentation control measures
 - 9) Impact on existing and proposed utilities
 - 10) Provide name of watershed and stream use designations
- f. Summary: In tabular form identify the area in acres, the required and provided Pe, ESDv, Cpv, Qp10 and Qf100 as applicable for the overall site
- g. Conclusions and recommendations
- h. Appendix (contains all computations, design charts and relevant data references. Number all sheets and provide list of included computations in the table of contents)

B. Drainage Area Map

- 1. ESD Drainage Area Map
 - a. Soil types and hydrologic soils groups shown on the map
 - b. ESD practices shown and labeled with corresponding outfalls indicated
 - c. Drainage areas showing the area (in acres), impervious area, pervious area, woods and ESDv required to each micro-scale practice
 - d. Grading shown to justify volume, surface area, disconnection practices and outfall locations
 - e. Summary table with required and provided stormwater ESDv, Pe, Cpv, Q10 and Q100 requirements (if applicable) listed

C. Hydrologic Computations

- 1. ESD to the MEP Calculations
 - a. Overall site analysis
 - 1) Site Area
 - 2) Limit of Disturbance (LOD)
 - 3) Pervious Area by soil type
 - 4) Pervious Area by soil type
 - 5) Woods Area by soil type
 - 6) Target RCN woods
 - 7) Rainfall target (Pe)
 - 8) Runoff depth to size ESD practices (Qe)

- 9) Total runoff volume required (ESDv)
- 10) Recharge volume required (Rev)
- 11) Cpv requirements (if applicable)

b. Sub Area Analysis

- 1) % impervious
- 2) Reduced RCN (if applicable)
- 3) ESDv required
- 4) ESDv provided
- 5) Rev provided per device/sub area

D. Soils Investigation

1. Geotechnical report submitted by the appropriate design professional giving conclusions and recommendations. Report shall include registration number, date, seal, signature and professional certification of the responsible design professional
2. Minimum boring locations: ESD Micro-scale practices – Minimum boring locations: 1 at least within 40 feet of each device
3. Fill areas identified
4. In-situ permeability test, minimum geotechnical requirements for infiltration, shall be based on Volume II of the Stormwater Design Manual, Appendix D.1. Minimum rate of 1.02 in/hr required for acceptability. (ex. Drywells and pervious pavement over 10,000 ft)
5. Rate of infiltration
6. Scaled boring location map with surface elevation

E. Plans Submission – include all of the following on plans

1. Stormwater Management Plan (1" = 50' or less) for ESD Micro-scale Practices
 - a. General Items
 - 1) Type of ESD and/or Disconnection Practice labeled per MDE nomenclature (i.e., M-1, M-2, N-1, N-2)
 - 2) Existing and final contours (1' or 2' interval)
 - 3) Existing and proposed improvements
 - 4) Locations of soil borings
 - 5) Outflow pipe, outlet protection (detail required), and outfall channel
 - 6) Positive overflow drainage away from structures
 - 7) Existing and proposed utility locations
 - 8) Show floodplain environmental sensitive areas, wetlands, etc.
 - 9) 5' buffer from end of outfall to property lines
 - 10) Outlet channel outside of stream or wetland buffers
 - b. Maintenance Items – provide vehicular access to all shared ESD practices
 - 1) Indicate the ownership and maintenance responsibility of the facility (i.e. private, HOA, or public)
 - 2) Minimum easement width = 20'
 - 3) Maximum slope for unpaved surface is 10%
 - 4) Maximum slope for paved surface is 12%

- 5) Maximum cross slope is 3%
- 6) Clear of structures (e.g. Utilities, drainage, fences, and streetlights)
2. Profiles and details for ESD Practices (consistent scales – e.g. 1”=5’, 1”=50’)
 - a. Alternative Surfaces (A-1, A-2, A-3)
 - 1) A-1 Green Roof – Provide a typical Green Roof Section
 - 2) A-2 Permeable Concrete – provide a section for the alternative pavement section
 - 3) A-3 Reinforced Turf – Provide a section for the alternative turf surface
 - b. Section & Profile through Micro-Scale Practice (M-2, M-5, M-6, M-7, M-9)
 - 1) Existing round and proposed grade
 - 2) Soil boring locations with plot of textural classes
 - 3) Observation well location(s) (centered)
 - 4) Observation well cap and lock with depth clearly marked
 - 5) Aggregate depth – give elevations and inverts
 - 6) Aggregate size: 12 to 1-1/2” inch minimum (with no fines)
 - 7) 1-foot minimum soil or gravel covering
 - 8) 6 inches of clean, washing sand on bottom of ESD practice
 - 9) Filter cloth specifications and location. No filter cloth on bottom of ESD practice
 - 10) Minimum 10’ from basement walls and 100’ from water wells in non-residential projects
 - c. Section & Profile through Micro-Scale Practice (M-1, M-3, M-4, M-8)
 - 1) M-1 Rainwater Harvesting – Provide a typical detail showing all connections and diversions
 - 2) M-3 Landscape Infiltration – Provide a cross section and profile along the berm
 - 3) M-8 Swales – Provide a cross section and profile along the swale. Show any check dams locations and provide a detail as applicable
 - d. Landscaping Section & Details
 - 1) Provide a landscaping plan for all pertinent ESD practices
 - 2) Provide a stormwater management landscape summary table specifying plant types, locations and quantities
3. Construction Specifications: Appendix B.4 of the MDE SWM Design Manual, “Construction Specifications for Environmental Site Design Practices”
4. Operation and Maintenance Schedule for each type of facility specifying routine and non-routine maintenance
5. Sequence of construction with approximate time frames for each operation
6. Certifications
 - a. Design Professional, sealed, signed and dated
 - b. Developer’s signed and dated

NOTE: SUBMISSION WILL NOT BE REVIEWED WITHOUT PROPERTY SIGNATURES

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