

## WASHINGTON COUNTY, LAND DEVELOPMENT ENGINEERING CHECKLIST SITE PLAN

DATE: \_\_\_\_\_

PROJECT: \_\_\_\_\_

COUNTY PLAN FILE NUMBERS: \_\_\_\_\_

DESIGN FIRM: \_\_\_\_\_

**INSTRUCTIONS:** To be completed by the applicant. It is to be signed by the appropriate design professional with the initial document submittal. Indicate "N/A" for not applicable and "✓" for included. Subsequent checklist submittals will be at the discretion of the Deputy Director, Land Development Engineering.

### **I. SUBMISSION DOCUMENTS**

- A. Road Adequacy and Site Distance Worksheets/Accident Analysis and Mitigation Plan included \_\_\_\_\_
- B. Stormwater Management/Storm Drain Computations \_\_\_\_\_
- C. Geotechnical Report for Stormwater Management \_\_\_\_\_
- D. Letter of Permission for Offsite Disturbance \_\_\_\_\_
- E. Approval from MSHA, MDE (if applicable) \_\_\_\_\_

### **II. SITE PLANS – 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. Planning file reference numbers, water & sewer contract numbers, etc. \_\_\_\_\_
  - 5. Washington County Land Development Engineering approval block \_\_\_\_\_
  - 6. Engineers certification \_\_\_\_\_
  - 7. Developers certification \_\_\_\_\_
  
- B. **VICINITY MAP REQUIREMENTS (COVER SHEET)**
  - 1. Scale 1" = 2000', north arrow shown \_\_\_\_\_
  - 2. ADC Map Coordinates \_\_\_\_\_
  - 3. Two (2) Washington County Geodetic Coordinates shown and labeled \_\_\_\_\_
  - 4. Site delineated \_\_\_\_\_
  - 5. Major roads identified \_\_\_\_\_

- 6. Washington County Survey Control shown

---

---

**NOTES AND INFORMATION (COVER SHEET)**

- 1. Washington County Standard General Notes for Site Plans
- 2. Site Analysis Data Sheet
- 3. Legend
- 4. Sheet Index

---

---

---

---

**C. GENERAL SHEET INFORMATION (ALL SHEETS)**

- 1. Plan scale 1" = 10' to 1" = 50'
- 2. Profile scale 1" = 5' vertical, 1" = 50' horizontal
- 3. Maximum drawing size = 24" x 36"
- 4. Minimum three (3) grid ticks with MD Grid Coordinates on plan sheets
- 5. North arrow
- 6. Match lines labeled and referenced
- 7. Profiles, details and cross-sections drawn to scale
- 8. Design Professionals seal, signature and date
- 9. Sheets numbered, consecutively; revisions noted with date

---

---

---

---

---

---

---

---

---

**D. BASE INFORMATION ON SITE PLAN - PLAN VIEW**

- 1. Existing Conditions
  - a. Streets – existing rights of way, property lines, property owners labeled, all easements, pavement width, and street names shown and dimensioned.
  - b. Existing Utilities – water and sewer, contract numbers, invert of existing storm drains at point of connection
  - c. Storm drains, size, material
  - d. Telephone, gas and electric lines and street lights (if available)
- 2. Proposed Conditions
  - a. Lots shown in solid line with lots numbered
  - b. Separate plan sheets for work within SHA right-of-way
  - c. Floodplain limits shown with sections and WSEL's
  - d. Wetland limits shown with buffers
  - e. Sensitive areas shown
  - f. Utility locations.

---

---

---

---

---

---

---

---

---

**III. SITE PLANS – (DESIGN INFORMATION)**

**A. ENTRANCE AND TRAVEL WAY DESIGN**

- 1. Show proposed street alignments, right of way widths, pavement widths.
- 2. Dimension entrance location at the road centerline and check for sight distance. Provide centerline station equation or coordinate value for intersection with existing road. Stationing shall start at centerline of existing road.

---

---

---

- 3. Label type of paving and dimension width, show and provide detail for curb and gutter, show and dimension sidewalks, dimension travelway and parking space dimension. \_\_\_\_\_
- 4. Provide location of curb and gutter transitions. \_\_\_\_\_
- 5. Show all curb fillet radii, as well as fillet PC and PT elevations and stationing. \_\_\_\_\_
- 6. Show direction of flow, indicate by small arrows in the gutter line. \_\_\_\_\_
- 7. Show auxiliary lanes and improvements to existing roadways dimensioned and stationed. Provide cross-sections every 50 feet for auxiliary lanes and road widening. \_\_\_\_\_
- 9. Show street tree locations and quantities, and any applicable easements. \_\_\_\_\_
- 10. Provide design vehicle turning template for entrance. Show internal movements for design vehicle (including loading dock parking). \_\_\_\_\_
- 11. For drive thru sites, show and dimension vehicle stacking required. \_\_\_\_\_

**B. STORM DRAINAGE (PROVIDE THE FOLLOWING)**

- 1. Drains - located by centerline stationing, coordinates or dimensions. \_\_\_\_\_
- 2. Drains - size, type, class, length and flow direction shown. \_\_\_\_\_
- 3. Drains - structure numbered beginning at downstream end of system as per drainage area map. \_\_\_\_\_
- 4. Drainage easements for surface flow greater than 5 cfs. \_\_\_\_\_
- 5. Easements or fee simple transfers for storm drains, stormwater management, utilities and 100-year floodplain (check against record plat). Show off site easements. \_\_\_\_\_
- 6. Label and dimension outlet protection, denote material type and size, and reference x-section detail. \_\_\_\_\_
- 7. Swales labeled, proposed grading shown, lining denoted, x-section locations noted, detail referenced. Max. side slope to be 3:1 within public right-of-way. \_\_\_\_\_

**IV. STORM DRAIN PROFILE SHEET (1" = 5' vertical, 1" = 50' horizontal)**

**A. BASE DATA**

- 1. Existing and finished ground line and/or pavement at centerline of storm drain shown. \_\_\_\_\_
- 2. Label road, pavement limits and right-of-way above profile \_\_\_\_\_

**B. HYDRAULIC COMPLIANCE**

- 1. Label size, type, class (if concrete) and grade of pipe quantity and velocity of design year flow; show partial velocity if pipe flow less than full (check minimum and maximum velocity) \_\_\_\_\_
- 2. Structures numbered and stationed (centerline to centerline) \_\_\_\_\_
- 3. Structure inverts labeled (Upstream & Downstream at each structure. Show size, type and inverts of all pipes at the structure(s) \_\_\_\_\_
- 4. 10-year Hydraulic gradient shown and labeled (top of pipe minimum.) \_\_\_\_\_

- 5. Show and label inlet and outlet channel protection, slope length, material type and class, d50, thickness,  $V_{10}$ , Q10, 3' toe wall, geotextile fabric, show proposed grading beyond outlet channel protection. \_\_\_\_\_
- 6. When connecting to existing system show existing storm drain structures, inverts, slope, 10-year HGL. \_\_\_\_\_
- 7. For all swales and open channels provide hydrology and hydraulic computations for 10-year (100 year where required) post development conditions. \_\_\_\_\_

**C. STRUCTURAL COMPLIANCE**

- 1. Pipe checked for allowable maximum and minimum cover \_\_\_\_\_
- 2. The use of pipe anchors, concrete cradle, bedding, or encasement checked \_\_\_\_\_
- 3. Compacted backfill areas (per AASHTO T-180) identified and noted on plans \_\_\_\_\_
- 4. Show all utility crossings (Label ex: proposed, typed and size) and check clearance (1' minimum outside of pipe to outside of pipe) \_\_\_\_\_
- 5. Indicate where concrete bottom required for structures \_\_\_\_\_

**V. CONSTRUCTION DETAILS**

**A. ENTRANCE DETAILS**

- 1. Road widening detail (section) for existing roads \_\_\_\_\_
- 2. Details not covered by County Standard Specifications \_\_\_\_\_
- 3. Tree planting detail(s) (as applicable) \_\_\_\_\_
- 4. Work Zone Traffic Control Plan \_\_\_\_\_
- 5. Traffic control signage and striping plan \_\_\_\_\_
- 6. Road pavement section detail specifying applicable station location \_\_\_\_\_
- 7. Road entrance and accell/decell lane section detail including adjacent drainage easements, tree plantings, sidewalk, pavement, C&G, swales, guardrail, swale and right-of-way limits - specify applicable station location. Entrance curb fillet radii dimensioned, pavement width, shoulder width, curb and gutter, sidewalk, guardrail, etc dimensioned/denoted. \_\_\_\_\_

**B. STORM DRAIN DETAILS**

- 1. Details of non-standard structures required – no typicals allowed \_\_\_\_\_
- 2. Structure schedule specifying type, location, standard detail, top elevation, bottom elevation. \_\_\_\_\_
- 3. Pipe Schedule specifying size, type, class (if concrete) and total length of each. \_\_\_\_\_
- 4. Typical riprap outlet protection detail and cross section. \_\_\_\_\_
- 5. Channel/swale cross section details with treatment, quantity and velocity of flow, and depth of flow. Channel profile detail may be required. \_\_\_\_\_

**VI. SUPPLEMENT DRAWINGS, INFORMATION**

**A. GRADING PLAN /SEDIMENT & EROSION CONTROL PLAN**

- 1. Limit of disturbance shown. \_\_\_\_\_
- 2. Existing and proposed contours labeled. \_\_\_\_\_
- 3. Proposed drainage breaks labeled. \_\_\_\_\_
- 4. Proposed SWM and SD system shown. \_\_\_\_\_
- 5. Proposed Sediment and Erosion Control shown. \_\_\_\_\_
- 6. FEMA Map Revision (Granted, Required, Applied for) \_\_\_\_\_

**B. STORM DRAIN DRAINAGE AREA MAP (MAXIMUM SCALE 1" = 200')**

- 1. Show and label proposed drainage system, pipe size, type and structure numbers include swales, road pavement, curb and gutter, proposed lot lines, proposed right-of-way lines, proposed easements, proposed building locations, existing building locations, existing topography to 200 feet from property line, existing water and sewer, existing down stream storm drain conveyance system, existing or proposed on site and offsite easements. \_\_\_\_\_
- 2. Label sub drainage areas to inlet structures and culverts; reference to design computations. \_\_\_\_\_
- 3. Provide runoff data. Show Tc flow path. Label sub area, "C" factor and percent of impervious area, (summary table may be used). \_\_\_\_\_
- 4. Label proposed contours, (consistent with grading plan). \_\_\_\_\_
- 5. Show 100-year floodplain WSEL. Provide cross sections either on Drainage Area map or Grading Plan. \_\_\_\_\_
- 6. Swale/channel capacity computations. \_\_\_\_\_
- 7. HEC RAS modeling (if required). \_\_\_\_\_
- 8. Outfall channel protection sizing computations. \_\_\_\_\_

**C. STORM DRAIN COMPUTATIONS (INCLUDE IN SUPPLEMENTAL COMPUTATIONS)**

- 1. Impervious area computations \_\_\_\_\_
- 2. Storm drain flow computations \_\_\_\_\_
- 3. Inlet & gutter computations \_\_\_\_\_
- 4. Hydraulic gradient & head loss computations \_\_\_\_\_
- 5. Culvert capacity computations (HY-8 or similar) \_\_\_\_\_
- 6. Swale/Channel capacity \_\_\_\_\_
- 7. HECRAS/HEC 2 model run \_\_\_\_\_
- 8. Outfall channel protection sizing \_\_\_\_\_

**VII. RETAINING WALLS IN SWM FACILITIES (privately owned & maintained, outside of right-of-ways)**

**A. GENERAL ITEMS TO INCLUDE:**

- 1. Retaining walls greater than 3' in height measured from finished grade at 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 Washington County right-of-way or easement \_\_\_\_\_
- 6. Computations signed and sealed by the appropriate design professional \_\_\_\_\_
- 7. Toe of retaining wall, tie backs, geogrid outside the 100' WSEL. \_\_\_\_\_
- 8. Maximum height of 3' in publicly maintained facilities. \_\_\_\_\_
- 9. Maximum height of 10' in privately maintained facilities. \_\_\_\_\_
- 10. Upper walls of tiered walls do not influence lower walls. \_\_\_\_\_
- 11. Retaining walls above upper maintenance bench less than 3' and in cut. \_\_\_\_\_
- 12. Retaining walls designed to withstand hydrostatic pressure and saturated ground conditions. \_\_\_\_\_
- 13. Retaining walls shall not be used as a pond embankment. \_\_\_\_\_
- 14. Retaining walls in excess of 30" in height shall have appropriate safety railing or fence. \_\_\_\_\_

**VIII. SUPPORTING INFORMATION – SWM (one copy required)**

- 1. SWM Design Plan Information form (Form WCSWM-1). \_\_\_\_\_
- 2. Pond Summary Sheet (SCS MD-Eng14). \_\_\_\_\_
- 3. Maintenance Agreement, Legal Description (Metes & Bounds) and attached drawings (executed by property owner and signed and sealed by design professional). \_\_\_\_\_
- 4. SWM Drainage area maps, pre & post development drainage areas; including drainage divides, area in acres, time of concentration flow paths and land uses with corresponding acreage, proposed SWM facility, proposed and existing storm drain conveyance system. \_\_\_\_\_
- 5. USDA Soils map with site and drainage area delineated. \_\_\_\_\_
- 6. Storm drain plans including any site areas not draining directly into pond (must show safe conveyance). \_\_\_\_\_
- 7. Sensitive areas map showing floodplains, wetlands, forested areas, steep slopes greater than 25%, and rock outcrops. \_\_\_\_\_
- 8. Pond structure hazard classification (per SCS378). \_\_\_\_\_
- 9. Erosion & sediment control plan. \_\_\_\_\_
- 10. Site in conformance with preliminary plat, final plat and/or previous site plan requirements or comments. \_\_\_\_\_
- 11. Existing / proposed down stream drainage easement statement regarding investigation of downstream effects (ability of downstream system to carry 10/25 year storm normal pond outflow). \_\_\_\_\_
- 12. Justify use of detention. \_\_\_\_\_
- 13. Bench mark shown on plans (datum per NAVD88 is preferable). \_\_\_\_\_
- 14. Coordinates shown on at least three monuments within the project area. Must be per NAD83 datum. \_\_\_\_\_

**A. HYDROLOGY**

- 1. Detailed narrative describing how stormwater management is addressed. \_\_\_\_\_
- 2. Pre-development RCN (TR-55 Worksheet #2). \_\_\_\_\_
- 3. Post-development RCN (TR-55 Worksheet #2). \_\_\_\_\_
- 4. Ultimate development RCN for off-site drainage area. \_\_\_\_\_
- 5.  $WQ_v, Re_v, C_p, Q_p$  &  $Q_f$ . \_\_\_\_\_
- 6. Pre-development TC (TR-55 Worksheet #3). \_\_\_\_\_
- 7. Post-development TC (TR-55 Worksheet #3). \_\_\_\_\_
- 8. Runoff hydrographs for 1-, 10-, 25- & 100-year storms (acceptable methods: TR-20, TR-55, PSUHM). \_\_\_\_\_
- 9. Basin Routing: using storage indication, TR-20 PSUHM; for post & ultimate development conditions. \_\_\_\_\_
- 10. For drainage areas greater than 30 acres, provide HEC RAS model for proposed conditions. Identify cross section locations every 100 feet and show 100-year WSEL for each cross section. \_\_\_\_\_
- 11. Other SWM Computations. \_\_\_\_\_
- 12. BMP Stage / Storage relationship. \_\_\_\_\_
- 13. BMP Stage / Discharge relationship (provide equations and cite references, include a graph plot for 10 yr conveyance; 100 yr where required). \_\_\_\_\_
- 14. Supply and channels sized using manning equation, limiting velocities checked for lining of ditches. \_\_\_\_\_
- 15. Anti-seep collar design. \_\_\_\_\_
- 16. Flotation analysis (factor of safety = 1.2:1). \_\_\_\_\_
- 17. Dam breach analysis (using SCS 378 method). \_\_\_\_\_
- 18. Downstream analysis of conveyance systems and hazards, include photos. \_\_\_\_\_
- 19. Routing storm through downstream development (if deemed necessary by Deputy Director). \_\_\_\_\_
- 20. Identify where SWM credits used (credit areas to be shown on plans). \_\_\_\_\_
- 21. Outfall channel protection design computations. \_\_\_\_\_

**IX. GEOTECHNICAL ANALYSIS:**

- 1. Geotechnical report (required for all sites / facility geotechnical report). Report shall include registration number, date and seal and signature of responsible design professional. \_\_\_\_\_
- 2. Geotechnical report recommends proposed SWM structure location is acceptable for proposed use. \_\_\_\_\_
- 3. Min. SWM Pond boring locations: borrow area, pond pool area, principle spillway, top of dam near abutment. \_\_\_\_\_
- 4. Boring logs with unified soil classification; blow counts, surface elevation of boring, depth gw encountered, fill areas identified, surface elevation. . \_\_\_\_\_
- 5. Note on plans, "If rock is encountered, undercut pond 18" and backfill with CL type soil". \_\_\_\_\_
- 6. Infiltration rate/in situ permeability test as per MDE 2000 Stormwater Design Manual for infiltration, bioretention, sand filters for soils below \_\_\_\_\_

- proposed facility. \_\_\_\_\_
- 7. Discussion of karst geology present. \_\_\_\_\_
- 8. Presence and location of existing sink holes. \_\_\_\_\_
- 9. Provide a note on plans, "Core trench and earth dam shall be compacted to a min. 95% max dry density". \_\_\_\_\_

**X. SITE ENVIRONMENTAL INVESTIGATION:**

- 1. 100 year floodplain delineated on the plan (include FEMA Panel Number). \_\_\_\_\_
- 2. Non-tidal wetlands delineated. \_\_\_\_\_

**XI. STORMWATER MANAGEMENT PLANS:**

**A. PLAN VIEW OF FACILITY (SCALE < 1" = 50'; I.E., 40', 30', ETC.)**

- 1. Existing and final contours (1' or 2' intervals).. \_\_\_\_\_
- 2. Existing and proposed improvements. \_\_\_\_\_
- 3. Ex. topography, contour labels, & site feature information extends a min. of 200' offsite. \_\_\_\_\_
- 4. Existing and proposed property lines and rights-of-way, all adjacent property owners labeled. \_\_\_\_\_
- 5. Locations of geotechnical borings. \_\_\_\_\_
- 6. Outflow pipe, outlet protection (detail required), outfall channel to stable outfall. \_\_\_\_\_
- 7. Emergency spillway outlet channel. \_\_\_\_\_
- 8. Proposed easements for ponding and/or pond slopes on private property. \_\_\_\_\_
- 9. Show minimum 15 foot setback from SWM facility toe of fill or top of cut to nearest property lines. Show minimum 25 foot setback from SWM facility outfall channel protection to nearest property lines. \_\_\_\_\_
- 10. Appropriate signature block for Land Development Engineering approval. \_\_\_\_\_
- 11. Engineer's Certification of as-built conditions. \_\_\_\_\_
- 12. Landscaping plan / landscaping details / plant schedule/ plant notes \_\_\_\_\_
- 13. Rev, WQ<sub>v</sub>, CP<sub>v</sub>, 10-yr (Q<sub>p10</sub>), 100-yr (Q<sub>f100</sub>) WSEL, permanent pool WSEL \_\_\_\_\_
- 14. Graphically identify all proposed non-structural credit areas. \_\_\_\_\_
- 15. Provide summary table identifying the area in acres, the required and provided Rev, WQ<sub>v</sub>, Cp<sub>v</sub>, Q<sub>p10</sub> and Q<sub>f100</sub> for each drainage area. In a narrative below the table, summarize the type of facility used to achieve each of the above requirements. \_\_\_\_\_
- 16. For all public facilities show fee simple swm parcel, lot with a minimum 25-foot wide fee simple access from public right-of-way. \_\_\_\_\_
- 17. Maintenance access road a minimum of 10' wide with maximum cross slope of 4:1, maximum longitude slope of 15%. No ditches may occupy the access easement area. Maintenance access must reach control structure and pond bottom. Maintenance access must reach forebay areas. \_\_\_\_\_
- 18. Maintenance easement area for private facilities delineated on the plan. \_\_\_\_\_
- 19. Maintenance schedule (shown on plans, ie. how often, minimum requirements). \_\_\_\_\_

- 20. Access entrance apron to be paved. \_\_\_\_\_
- 21. Existing and proposed utilities and utility easements \_\_\_\_\_
- 22. Show and label limits of pond forebay, forebay weir, forebay weir protection and reference detail. \_\_\_\_\_
- 23. Show and label principal spillway, control structure, limits of embankment fill stationed. \_\_\_\_\_
- 24. Limits of pond liner labeled (if applicable). \_\_\_\_\_

**B. PUBLIC SAFETY CONSIDERATIONS:**

- 1. Slopes – no steeper than 3:1 anywhere around pond. \_\_\_\_\_
- 2. For ponds with permanent pool, show and label under water safety bench. \_\_\_\_\_
- 3. Show & label 4’ chain link fence required when pool depth is 4.0’ or greater for the 100-yr storm. \_\_\_\_\_
- 4. Fence located 5’ from SWM boundary the top or toe of slope, fence not permitted on berm. \_\_\_\_\_
- 5. Flared end sections (or headwall) on all pipes. \_\_\_\_\_
- 6. No trees or shrubs permitted on the embankment \_\_\_\_\_
- 7. Pond embankments (fill) planted with grass only (or approved perennial alternative) \_\_\_\_\_
- 8. Ponds > 8’ deep (measured to 100-year W.S.E.L.) shall be benched within the ponding area 4’ horizontally at 4’ elevation intervals. \_\_\_\_\_
- 9. Ponds which pass the 100-year storm through the principal spillway shall include a token spillway 1’ below top of dam, min. 8’ width, located entirely within cut soils. \_\_\_\_\_

**C. PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS:**

- 1. SWM Existing and proposed ground:
  - a. Dam side slopes labeled. \_\_\_\_\_
  - b. Top width meets MD-378. top elevation – constructed and settled \_\_\_\_\_
  - c. Wave erosion protection (as directed by Deputy Director – Land Development). \_\_\_\_\_
  - d. Minimum 1’ cover over top of spillway \_\_\_\_\_
- 2. Core Trench:
  - a. Bottom width (4’ minimum). \_\_\_\_\_
  - b. Side slopes (1:1 maximum steepness) \_\_\_\_\_
  - c. Depth minimum 4’, below the bottom of the dam. \_\_\_\_\_
  - d. Core trench extends to where 10-year water surface elevation ties into existing grade. \_\_\_\_\_
  - e. Core trench extends 4’ below principal spillway. \_\_\_\_\_
- 3. Principal Spillway:
  - a. Barrel must be circular or cast-in-place concrete box. \_\_\_\_\_
  - b. Identify type of material, arch, dia., slope, length, gauges, corrugations size & coating (if metal) \_\_\_\_\_
  - c. Pipe capable of imposed soil loadings \_\_\_\_\_
  - d. Minimum barrel size 12” (County policy, not MD-378). \_\_\_\_\_
  - e. Barrel dia.  $\geq 36$ ” requires use of concrete pipe. \_\_\_\_\_

- f. Note on plans, "All pipe joints shall be watertight". \_\_\_\_\_
- g. Concrete cradle entire length of concrete pipe. \_\_\_\_\_
- h. Grate over barrel outlet when barrel dia.  $\geq 36"$  (use similar design as trash rack). \_\_\_\_\_
- 4. Riser structure (detail required):
  - a. Same material as the principal spillway pipe. \_\_\_\_\_
  - b. All dimensions required for construction. \_\_\_\_\_
  - c. Minimum difference in elevation between lowest orifice & barrel invert  $>0.1'$  \_\_\_\_\_
  - d. Trash rack: removable, minimum #4 rebar on 6" centers both ways, vertical bars on outside. \_\_\_\_\_
  - e. Trash rack must be 3-dimensional – no flat trash racks. Removable trash rack must be accessible during high water event. \_\_\_\_\_
  - f. Anti-vortex device (detail required if used). \_\_\_\_\_
  - g. Trash rack to be galvanized (hot dipped, not painted). \_\_\_\_\_
  - h. Principal spillway crest elevation at least 1' below the emergency spillway elevation. \_\_\_\_\_
  - i. Principal spillway used as emergency spillway, meeting minimum of 3 s.f. flow area. \_\_\_\_\_
  - j. Riser does not control flow in orifice regime (transition from riser weir control to pipe control) without riser functioning as an orifice. \_\_\_\_\_
  - k. Design Elevation (s) \_\_\_\_\_
  - l. If a drawdown device is used for sediment control, provide the following note on plans, "*The drawdown device shall be removed after the site is stabilized and authorization is received from the MD Dept of the Environment & NRCS*". \_\_\_\_\_
  - m. Low flow orifice to be anchored and supported. \_\_\_\_\_
  - n. Show and label reinforcing. \_\_\_\_\_
  - o. Provide key joint detail. \_\_\_\_\_
  - p. Provide dewatering device, gate valve and stem (as applicable). \_\_\_\_\_
- 5. Anti-Seep Collars (detail required):
  - a. Size, increase seepage length by 15% of the outside of saturated pipe length. \_\_\_\_\_
  - b. Collars located at least 2' from a pipe joint. \_\_\_\_\_
  - c. Material and method of connection described. \_\_\_\_\_
  - d. Maximum collar spacing 14 times the minimum collar projection. \_\_\_\_\_
  - e. Minimum collar spacing 5 times the minimum collar projection. \_\_\_\_\_
  - f. Phreatic line (4:1 slope) measured from intersection of the dam and a horizontal projection of the 10-year water surface elevation. \_\_\_\_\_
  - g. Collar projection min. of 2' around pipe. Entire collar located within the phreatic zone. \_\_\_\_\_
- 6. Outfall Protection (detail required):
  - a. Outfall protection sized for principal spillway capacity. \_\_\_\_\_
  - b. Cross-section provided for the outfall channel at the barrel outlet and where the outfall meets existing contours (appropriate dimensions and elevations). \_\_\_\_\_

- c. Outfall dimensions: geometric shape, slope, and lining. \_\_\_\_\_
- d. Show 3' minimum deep rip-rap toe wall. \_\_\_\_\_
- e. Median rip-rap MSHA class and size (d50). \_\_\_\_\_
- f. Maximum rip-rap size ( $D_{max} = d50 \times 1.5$ ). \_\_\_\_\_
- g. Rip-rap thickness specified: minimum =  $2.0 \times d50$ . \_\_\_\_\_
- h. Rip-rap laid on filter fabric. (specify filter fabric type) \_\_\_\_\_
- i. Plunge pool or still basin detail (as required). \_\_\_\_\_
- 7. Elevations (including required freeboard):
  - a. Top of dam (constructed and settled). \_\_\_\_\_
  - b. Crest of emergency spillway (minimum of 2' below top of settled dam). \_\_\_\_\_
  - c. Water surface elevation for PP, WQ<sub>v</sub>, C<sub>p</sub><sub>v</sub>, 10 & 100-year storms. \_\_\_\_\_
  - d. If principal spillway is intended to pass emergency storm, min. freeboard shall be increased to 2'. \_\_\_\_\_
  - e. All control structure opening inverts \_\_\_\_\_
- 8. Cross-section Through the Dam Across Centerline:
  - a. Existing ground shown. \_\_\_\_\_
  - b. Top of dam (constructed and settled). \_\_\_\_\_
  - c. Location of emergency spillway shown completely in cut. \_\_\_\_\_
  - d. Minimum emergency spillway width >8' with 3:1 side slopes. \_\_\_\_\_
  - e. Top of core trench to extend to elevate where 10-year WSEL ties into existing grade. \_\_\_\_\_
  - f. Bottom of core trench shown 4' below embankment fill and 4' below principal spillway structure. \_\_\_\_\_
  - g. Principal outlet barrel shown. \_\_\_\_\_
  - h. Location of said borings shown and labeled. \_\_\_\_\_
- 9. Profile Along Centerline of Emergency Spillway:
  - a. Located in a cut section. \_\_\_\_\_
  - b. Level control section provided (25' min.). \_\_\_\_\_
  - c. Minimum straight length of channel below the control section (ref. MD Std's & Specs for sediment & erosion control, section 18.16). \_\_\_\_\_
  - d. Spillway crest elevation shown. \_\_\_\_\_
- 10. Construction Specifications:
  - a. Earth fill: material, placement, compaction, and core trench. \_\_\_\_\_
  - b. Pipe conduits. \_\_\_\_\_
  - c. Concrete. \_\_\_\_\_
  - d. Filter cloth, trash rack material \_\_\_\_\_
  - e. Rip-rap and slope protection. \_\_\_\_\_
  - f. Fencing (Wash Co. Std's & Specifications) with min. 12' gate opening. \_\_\_\_\_
- 11. Miscellaneous Items:
  - a. Title Block. \_\_\_\_\_
  - b. Inspector check off list / sequence of construction. \_\_\_\_\_
  - c. Property line outline and owner information. \_\_\_\_\_
  - d. Vicinity map. \_\_\_\_\_
  - e. North arrow. \_\_\_\_\_
  - f. Certifications: Owner / Developer; Designer; etc. \_\_\_\_\_
  - g. Miss Utility note. \_\_\_\_\_

- h. Sealed by P.E. or Professional L.S. \_\_\_\_\_
- i. **NOTE:** All grading on lot, either before or after the construction of a dwelling or appurtenances, shall be the full responsibility of the lot owner. \_\_\_\_\_
- j. **NOTE:** No permanent structures (fences, sheds, play equipment, retaining walls) shall be permitted within any storm drainage easement either shown or described on the final plat of subdivision. \_\_\_\_\_

**XII. SUPPORTING INFORMATION – UNDERGROUND DETENTION (one copy required):**

- 1. Justify use of detention / underground structure \_\_\_\_\_
- 2. Structural calculations for pipe loadings \_\_\_\_\_
- 3. Flotation analysis for entire structure-factor of safety=1.2:1 \_\_\_\_\_
- 4. Pipe capable of imposed soil loadings \_\_\_\_\_

**XIII. STORMWATER MANAGEMENT PLANS – UNDERGROUND DETENTION – ADDITIONAL INFORMATION REQUIRED:**

- A. **PLAN VIEW OF STRUCTURE (scale <math>1''=50'</math>; i.e. 40', 30', etc.)**
  - 1. Grit Chamber \_\_\_\_\_
  - 2. Minimum of one (1) access ports per storage pipe / chamber \_\_\_\_\_
- B. **DETENTION CHAMBERS DETAIL (section & profile):**
  - 1. Pipe must have a 48" minimum rise \_\_\_\_\_
  - 2. Pipe joints must be water tight \_\_\_\_\_
  - 3. Pipes laid on prepared subgrade with 12" gravel or sand bed \_\_\_\_\_
  - 4. Minimum 1.0' fill over pipe (or per manufacturers loading criteria) \_\_\_\_\_
  - 5. Concrete pipe Class III or HDPE \_\_\_\_\_
  - 6. Profile thru structures (s) showing CP, 10, 100-year WSEL \_\_\_\_\_
- C. **STRUCTURE INLETS DETAIL:**
  - 1. Same material as detention chamber \_\_\_\_\_
  - 2. Grates to be bolted on \_\_\_\_\_
  - 3. No surcharging during 100-year storm \_\_\_\_\_
- D. **PUBLIC SAFETY CONSIDERATIONS:**
  - 1. Flared end sections (or head wall) on all pipes \_\_\_\_\_
  - 2. Traffic bearing grate \_\_\_\_\_
  - 3. Bolt on grates \_\_\_\_\_
  - 4. "Confined Space" warning sign at access point \_\_\_\_\_
- E. **CONSTRUCTION SPECIFICATIONS:**
  - 1. Earth fill: material, placement, compaction \_\_\_\_\_
  - 2. Pipe conduits \_\_\_\_\_
  - 3. Concrete \_\_\_\_\_
  - 4. Rip-rap and slope protection \_\_\_\_\_

**XIV. SUPPORTING INFORMATION – INFILTRATION (one copy required):**

- 1. Justify use of detention / underground structure \_\_\_\_\_
- 2. Structural calculations for pipe loadings \_\_\_\_\_
- 3. Flotation analysis for entire structure-factor of safety=1.2:1 \_\_\_\_\_
- 4. Pipe capable of imposed soil loadings \_\_\_\_\_

**XV. STORMWATER MANAGEMENT PLANS – INFILTRATION – ADDITIONAL INFORMATION REQUIRED:**

- A. **PLAN VIEW OF STRUCTURE (scale <1”=50’; i.e. 40’, 30’, etc.)**
  - 1. Observation well location shown. \_\_\_\_\_
  - 2. Stone diaphragm or stone trench or other pretreatment. \_\_\_\_\_
- B. **SECTION & PROFILE THROUGH INFILTRATION TRENCH**
  - 1. Existing ground and proposed grade \_\_\_\_\_
  - 2. Geotechnical boring locations. \_\_\_\_\_
  - 3. Observation well location. \_\_\_\_\_
  - 4. Observation well cap and lock. \_\_\_\_\_
  - 5. Aggregate depth and stone size specifications. \_\_\_\_\_
  - 6. 1 foot minimum soil or gravel covering. \_\_\_\_\_
  - 7. 6 inches clean, washed and on bottom of trench. \_\_\_\_\_
  - 8. Filter cloth top and sides. \_\_\_\_\_
  - 9. Bottom and top elevations provided. Minimum buffer to ground water table. \_\_\_\_\_

**XVI. STORMWATER MANAGEMENT PLANS – FILTRATION- ADDITIONAL INFORMATION REQUIRED:**

- A. **PLAN VIEW OF STRUCTURE (scale <1”=50’; i.e. 40’, 30’, etc.)**
  - 1. Geotechnical boring locations shown in plan view. \_\_\_\_\_
  - 2. Landscaping plan required for bioretention facilities. \_\_\_\_\_
  - 3. Show and label pretreatment. \_\_\_\_\_
  - 4. Minimum top width of berm 3 feet. \_\_\_\_\_
  - 5. Bioretention facility to be off line. Show flow splitter device. \_\_\_\_\_
- B. **SECTION DETAIL**
  - 1. Dimension and label mulch, planting soil, sand layer. \_\_\_\_\_
  - 2. Label top and bottom elevations. \_\_\_\_\_
  - 3. Under drain required. Label pipe material and size. Min. slope 0.5%. \_\_\_\_\_
  - 4. All bioretention facilities in karst areas to have clay or geosynthetic liner bottom and sides. \_\_\_\_\_

**XVII. STORMWATER MANAGEMENT PLANS – OPEN CHANNEL SYSTEMS – ADDITIONAL INFORMATION REQUIRED:**

- A. **PLAN VIEW OF STRUCTURE (scale <1”=50’; i.e. 40’, 30’, etc.)**
  - 1. Pretreatment shown and labeled \_\_\_\_\_
  - 2. Under drain location (if applicable).. \_\_\_\_\_
- B. **SECTION & PROFILE DETAIL**

1. Dimension and label bottom width, side slopes, top width, design storm WSELs. \_\_\_\_\_
2. Dimension and label under drain pipe, material, size, slope, bedding material (if applicable). \_\_\_\_\_  
\_\_\_\_\_

**XVIII. ADDITIONAL COMMENTS:**

1. Check if additional comments have been attached. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Prepared by: \_\_\_\_\_

Name (signed)

Company

Date

\_\_\_\_\_  
Name (printed)

Registration Number

Telephone

Developer: \_\_\_\_\_

Telephone