PRINCE GEORGE'S COUNTY GOVERNMENT
Department of Permitting, Inspections and Enforcement
(301) 883-5710

STORM DRAIN & PAVING DESIGN REVIEW CHECKLIST

This checklist serves as a guide for the consultant in the preparation and for the County the review of Storm Drain Plans. Any questions regarding items contained herein should be referred to the Prince George's County DPW&T for clarification. Applicable page number or section in the Stormwater Design Manual, County Code, or MDE Design Manual for specific design criteria are included for reference.

NOTE: PLANS SUBMITTED WITHOUT A COMPLETED CHECKLIST MAY BE RETURNED WITHOUT REVIEW

Site/Project Name: _____ Date: _____

Consultant: _____ Applicant: _____

Phone Number: _____ Phone Number: _____

Email Address: _____ Email Address: _____

Concept Plan No.:_____ Site Development Plan No.: _____

Permit No: _____

Consultant: Please complete the checklist below by indicating the following:
C or ✓ = Complete or checked; X = Not Applicable; O = Outstanding, need to address
Please place the appropriate symbol in the CONSULT column.✓ = Complete or checked; X = Not Applicable; O = Outstanding/need to address

Item #	Design Checklist Item	Reference	CONSULT	DPIE
A	**COVER SHEET**			
A-1	Title Block: Name of Project (Legal Subdivision Name), Sheet Title, Election District, County, and State.			
A-2	Vicinity Map in upper right hand corner of sheet.			
A-3	Blank space on right hand side of each sheet for DPIE approval stamps, to be applied by DPIE.			
A-4	DPIE plan certification blocks and Miss Utility Note			
A-5	PGSCD approval block shown if SWM or ESD devices part of plan.			
A-6	County standard Storm Drain and Paving notes shown.			
A-7	As-built consultant certification and blank space left in bottom right corner of sheet for DPIE as built approval stamps, to be applied by DPIE, all sheets.			

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Item #	Design Checklist Item	Reference	CONSULT	DPIE
A-8	Owner/Developer/Applicant noted.			
A-9	Sheet Index provided.			
A-10	Permit Table completed.			
B	**PLAN VIEW GENERAL**			
B-1	Sheet size—No greater than 36″ x 24″.			
B-2	Title block—Name of project, type of plan (public and/or private), election district, Prince George's County, and State of Maryland			
B-3	North arrow and datum—New projects require the latest Maryland Coordinate System (State plane grid) based on North American Datum of 1983 (NAD83); vertical—North American Vertical Datum of 1929 (NAVD29) ;with a minimum of three ticks labeled per sheet.			
B-4	Scale—1″ = 50′ for single family and 1″ = 30′ for townhouse, industrial, and commercial			
B-5	Vicinity map with Prince George's County page and grid (first sheet)—Use 1″ = 2000′ scale.			
B-6	Applicant's company name, contact name, contact position, address, phone, fax, and e-mail (first sheet)			
B-7	DPIE Approval stamps—leave a 5″ margin border on right side, all sheets (DPIE to apply stamps).			
B-8	"Miss Utility" note			
B-9	Utility certification—Sealed and dated by a professional engineer. Utility certification must be provided along with a schedule showing dates on which coordination was done to verify existing utilities (first plan sheet). [Affix to roadway construction plan] **UTILITY CERTIFICATION** I HEREBY CERTIFY THAT THE EXISTING AND/OR PROPOSED UNDERGROUND UTILITY INFORMATION SHOWN HEREON HAS BEEN CORRECTLY DUPLICATED FROM UTILITY COMPANY RECORDS, FURTHER, THAT THIS PROJECT HAS BEEN CAREFULLY COORDINATED WITH EACH INVOLVED UTILITY COMPANY, AND ALL AVAILABLE UNDERGROUND UTILITY INFORMATION RELATIVE TO THIS PLAN HAS BEEN SOLICITED FROM THEM. _____ ENGINEER'S NAME, P.E. MD REGISTRATION NO. _____, EXPIRATION DATE: _____			
B-10	Existing and proposed buildings—Show existing and proposed buildings that are adjacent to the proposed storm drain system			
B-11	Show existing, proposed and future road names in vicinity of plan.			
B-12	Limits of Department permit—Clearly show limits of permit by cross-hatching areas that are not part of the current permit and by labeling permit numbers for all phases on the plan			
B-13	All drafting symbols per Department of Environmental Resources Standards 1.0 and 1.1			
B-14	Minimum text size: 0.08 or 0.10 inch tall is recommended			
B-15	Limits of approved 100-year flood plain (label Floodplain Review Section (FPS) Number)			

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B-16	Secondary overflow path for the 100-year storm is to be shown with directional arrows.			
B-17	Labeling of adjacent property ownership and/or plat reference			
B-18	Survey control (traverse) stations on plan, if necessary and no centerline control is available. Bench marks (minimum of two) on plan, if necessary.			
B-19	Property lines, Lot and block numbers			
B-20	Golf cart crossings—Clearly show all golf cart crossings with labels identifying the type of crossing (*e.g.*, at-grade crossing, tunnel crossing, bridge crossing, etc.); MIDBLOCK CROSSINGS ARE NOT PERMITTED.			
B-21	Professional engineer's seal and signature			
B-22	Ultimate roadway width—Label the proposed AND ultimate roadway AND right of way width for all existing and proposed public roads.			
B-23	Lot coverage—Provide a table on every plan sheet showing the number of lots for the entire area governed by the Department street construction permit, using the following format:			
B-24	Provide permit table Department Permit Number | Parcel and/or Lot and Block Identifiers |			
B-25	**UTILITIES** • Show all existing and proposed water and sewer lines, house connections and appurtenances, including contract numbers.. • Show all existing storm drain lines, including contract numbers. • Show gas lines • Show electric poles, pole numbers, guy wires, and underground conduits. • Show telephone poles, pole numbers, guy wires, and underground conduits. • Show any other facilities (cables, streamlines, etc.). • Show area dedicated for water meters in townhouse lots. • Show that all utility poles have been placed at the ultimate right-of-way within the project limit, including the frontage with all existing roads of the subject property.			
C	**PLAN VIEW STORM DRAIN**			
C-1	All environmental features shown including floodplain and buffer.			
C-2	3 grid tics shown.			
C-3	Existing and proposed grading with buildings shown. Note first floor and walkout elevations as appropriate.			
C-4	Existing storm drain lines labeled.			
C-5	All adjacent property owners shown.			
C-6	Street names and ROW width noted.			
C-7	Match lines coordinated with current number of sheets.			
C-8	Storm drain designed to handle Master Plan development of the drainage area.			
C-9	Storm drain structure shall handle the maximum discharge for the interim or final development condition and locate for ultimate development of street system.			
C-10	Confirm adequate capacity of existing and/or approved storm drain system for connection to proposed system.			

Item #	Design Checklist Item	Reference	CONSULT	DPIE
C-11	Maximum 10 foot long A-inlet on cul-de-sac bulb.			
C-12	The maximum street spreadshall be 10 feet.			
C-13	Collect at least 70% of flow at all street inlets.			
C-14	Maximum ponding depth for non-public paved areas shall be 6”.			
C-15	All pipes and structures shall be a minimum of 5 feet horizontal from all other utilities and 1 foot vertical.			
C-16	Storm drain pipe parallel to property lines should be located minimumof 2 feet from the property line to allow for fencing of the property.			
C-17	Pipe generally shall be located in the center of easement.			
C-18	Note size and material of pipe.			
C-19	Use 15” minimum pipe size for all main line public systems. Pipe diversions to ESD devices or SWM facilities may be smaller.			
C-20	Pipe systems 30” or larger may have horizontal curves. Maximum pipe distance between manholes should be limitedto 400 feet.			
C-21	The angle of the pipe entering a structure with a flat wall shall not exceed 45 degrees			
C-22	Provide an inlet so flow in gutter is less than 3 cfs across street intersections or commercial driveways unless a valley gutter is required and then the capacity shall be 2 cfs.			
C-23	Yard inlets to show 10- year ponding limits.			
C-24	Ensure that positive drainage (>2.5% for graded areas and 2% for sodded areas) to yard inlet is maintained. Coordinate with Site Plan.			
C-25	Flow in swale crossing lot lines shall not exceed 3cfs.			
C-26	Inlets must be located a minimum of 3 feet from fillet PC or PT and a minimum of 5 feet from driveway aprons.			
C-27	Maximum flow in swales in Marlboro Clay area not to exceed 2 cfs for 100-year storm.			
C-28	A maximum of 2 feet of ponding from grate or throat at low point in a yard. Coordinate with Site Plan.			
C-29	100 year overflow path prominently shown.			
C-30	Note that pipe stubs are to be brick shut and the end should be labeled with the originating structure number followed by letter “S”.			
C-31	Pipe stubs to be extended through 10 foot PUE.			
C-32	Field connections for private systems only. Label with “FC”.			
C-33	Removal and/or relocation notes for existing storm drain and structures (as applicable). Note use of flowable fill for pipes that are to be abandonded in streets.			
C-34	Sufficient notes and details shall be provided when converting existing inlets to manholrd or vice versa.			
C-35	For parallel pipes, provide at least 2 feet or the diameter of the pipe divided by 2 between the pipes.			
C-36	Utility crossing should be, but is not always required to be, between 45 and 90 degrees.			
C-37	Provide note for bicycle safe grates when structure with grates areused in paving section.			
C-38	If available, note the liber/folio for storm drain or SWM easements. Not required for plan approval, but will be required for all as-built drawings.			

Item #	Design Checklist Item	Reference	CONSULT	DPIE
D	**PLAN VIEW PAVING & ROADWAY DESIGN**			
D-1	Entranceways—Do the proposed entranceways create any sight-distance hazards? (submit sight distance evaluation).			
D-2	Widening—Where widening of an existing roadway is proposed, cross-sections every 50 feet are required that show existing road, proposed widening, and future road section. As a minimum, each cross-section should represent full width of ultimate right-of-way and any additional width in order to show grade tie-outs			
D-3	Scenic or historic roads—To indicate scenic or historic roads that are covered by the street construction permit, add a bold note at the bottom left of the drawing.			
D-4	Mill and overlay—Indicate on plan the mill (minimum 2 inches) and overlay requirements for frontage improvements (to the centerline), including utility pavement restoration requirements (Specifications and Standards, Appendix E: Prince George's County Policy and Specification for Utility Installation and Maintenance), roadway transitions (50 feet), and pavement marking.			
D-5	Road grades should be labeled with directional arrows for proposed roads on tangent portions, grade breaks, and points of vertical reverse curvature (PVRCs).			
D-6	Note paving, curb and gutter, and sidewalk replacements. Shade proposed road and sidewalks under this permit.			
D-7	Provide typical paving section. Include subgrade/subbase preparation requirements after first review.			
D-8	Show fillets and cul-de-sacs numbered in triangles to relate to fillet and cul-de-sac profiles.			
D-9	Show sidewalks and sidewalk ramps at road intersections. Begin crosswalks 4 feet from fillet points (toward the intersection) and place ramps at midpoint of the curve. Two sidewalk ramps may be required within each fillet in cases of arterial and major collector roadways. Typical width of crosswalk is 6 feet minimum and 10 feet maximum in high pedestrian-count areas.			
D-10	**Barricades**—If road ends, post a barricade; if an existing road is being extended, remove the barricade.			
D-11	Show top of curb (TC) elevation/stations at all point of curvature (PC) and point of tangency (PT) stations, property lines within cul-de-sacs, and curb fillet PC and PT stations with offsets from centerline.			
D-12	Show curb radii at road intersections and spill gutter.			
D-13	Roads and sidewalks proposed under this permit shown as shaded.			
D-14	Driveway culvert sizes for rural sections noted			
D-15	Provide a tie to the existing road centerline and property line for a commercial driveway entrance.			
D-16	Provide **erosion protection** at ends of all curbs and gutters, where an outfall situation would be created due to termination of road construction.			
D-17	Show any flumes within a fill area in R/W at termination of street construction.			
D-18	Slope—When the slope across a road intersection is less than 1.5 percent, provide concrete valley gutters.			
D-19	Drainage directional arrows should be provided at all road intersections.			

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D-20	For all townhouse courts, one paving cross-section and location should be shown for each court.			
D-21	The minimum radius for a fillet at an intersection with the largest road being a primary and/or secondary road shall be 37 feet.			
D-22	The minimum radius for a fillet at an intersection where the largest road is a collector road shall be 45 feet.			
D-23	The minimum radius for a fillet at an intersection where the largest road is an arterial road shall be 50 feet.			
D-24	**CURB PROFILES—CUL-DE-SACS** (Provide only if this information is not already on the applicable road/street grade establishment plans.) • Approach grades and TC elevations should match the road/street grade at PC and PT. • A TC elevation should be provided for each PC, PT, PRC, and lot line to the nearest tenth. • Profile number in each triangle should match the plan view. • High or low point TC elevations should be provided to the nearest tenth and dimension from the closest lot line. • There should be a smooth curve throughout. • Datum elevation should be provided. • The road name should be provided at or near the PC and PT. • Lot numbers should be provided above the profile.			
D-25	**CURB PROFILES—FILLET PROFILES** (Provide only if this information is not already on the applicable road/street grade establishment plans.) • Approach grades and TC elevations should match the road/street grade at PC and PT. • Profile number in each triangle should match the plan view. • High, middle, and low point TC elevations should be provided to the nearest tenth and dimension from the closest PC and PT. • There should be a smooth curve throughout. • The road name should be provided at or near PC and PT.			
D-26	**TRAFFIC AND TRANSIT** • Ensure that proposed entranceways do **not** create any **sight-distance hazards**. Use Form B-16 (see Appendix B) and Section I, Table I-2, of the Specifications and Standards. • Provide, when required, **acceleration, deceleration,** and **bypass lanes** in accordance with Standard 200.21. • When applicable, provide **raised** and **reflectorized pavement markers (RPM)** per Standards 700.15–700.16. • To ensure that all required **transit appurtenances** (e.g., shelter, bus stop signs, etc.) are constructed, the Permittee should coordinate with the Division of Transit at (301) 883-5656.			
D-27	Roadway evaluated for required guardrails per AASHTO. Plans identify extent of guardrail required.			
D-28	Road grade established to pass 100 year floodplain flows with adequate freeboard.			

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D-29	Roadway complies with all county standards or waiver request has been submitted to the Director for consideration. • Complies with Standard road sections • Complies with Standard road horizontal radii • Complies with Standard road grades • Complies with Standard sidewalk (widths, both sides) • Bike Lanes provided on both sides of roadways for Arterial and Collector roadways			
D-30	Provide truck turnaround in dead end parking lots (townhouse, commercial, industrial, etc). Identify location of trash dumpsters and provide adequate geometrics in parking lots for truck access.			
D-31	Curb return or nose down curb may be required at the end of curb.			
D-32	Traffic: Evaluate traffic impact study and AASHTO. Confirm that length and configuration of intersection turn lanes, accel and decel lanes provide minimum stacking distance and taper length. Turn lanes shall be provided as needed. Appropriate lengths and tapers shall be determined using the cited references. (Reference: MD SHA, State Highway Access Manual; AASHTO's A Policy on Geometric Design of Highways and Streets; MD MUTCD).			
D-33	Traffic: Where feasible, new roadways/driveways should be aligned directly across from existing roadways/driveways.			
D-34	Traffic: New/proposed access points should be spaced a sufficient distance from existing intersections as to not adversely impact traffic operations or safety. The permitting agency may provide additional guidance on a case by case basis, as needed.			
D-35	Traffic: Median breaks should be a minimum of 600' apart.			
D-36	Traffic: Adequate intersection and stopping sight distance must be provided at all new roadways and access Points. (Reference: AASHTO's A Policy on Geometric Design of Highways and Streets)			
D-37	Traffic: Acceleration and deceleration lanes shall be provided when needed to address traffic volumes, safety, speeds and as determined by the permitting agency. Appropriate lengths and tapers shall be determined using the cited references. (Reference: MD SHA, State Highway Access Manual; AASHTO's A Policy on Geometric Design of Highways and Streets; MD MUTCD).			
D-38	In most cases, bypass lanes should only be provided when a left turn lane is not possible. When used, bypass lanes shall be designed to accommodate the necessary speeds. (Reference: MD MUTCD)			
D-39	The number of access points for an individual commercial property should be minimized as to reduce the amount of operational conflict. Multiple accesses must be justified and may not be approved if they adversely impact traffic operations and safety.			
D-40	Roundabouts: • Design elements shall comply with the guidance provided in the latest edition of the FHWA's Roundabouts: An Informational Guide. • Entry lanes: single lane entries shall be between 14' – 18' from face of curb to face of curb; double lane entries shall be between 28' – 32' from face of curb to face of curb.			

Item #	Design Checklist Item	Reference	CONSULT	DPIE
D-40	Roundabouts (continued) • Circulating lanes shall be, at a minimum, as wide as the entry lanes and, at a maximum, 20% wider than the entry lanes. • Crosswalks on the legs of the roundabout should be a minimum of 20′ back from the top of the divisional island. • Bike lanes shall end 100′ prior to the roundabout. Ramps shall be provided for bikes to exit the roadway at this point. (Reference: FHWA's Roundabouts: An Informational Guide; AASHTO's Guide for Development of Bicycle Facilities). • Sidewalks around the roundabout shall be 10′ to accommodate pedestrians and bicyclists. • Driveways and accesses shall not be permitted on roundabout approaches within the length of divisional island. • Parking shall not be permitted in or on the approach to the roundabout.			
E	**STORM DRAIN & DRAINAGE RIGHTS-OF-WAY**			
E-1	Storm drain easements per Chapter 11 of design manual. In general extend easement to adjacent property lines if strips less than 2 feet. Avoid multiple courses.			
E-2	Use Appendix 11 For easement widths for dual or more pipes parallel to each other.			
E-3	Outfall easement sized to allow for future vehicular access below headwall. Easement extended to property line or stream channel.			
E-4	Provide additional PUE if storm drain pipe encroaches into existing or proposed PUE.			
E-5	Show all easements including but not limited to WSSC, PUE, floodplain, etc.			
E-6	Surface drainage easements shown on lots. Coordinate with Site Plan.			
F	**DRAINAGE AREA MAP & COMPUTATIONS**			
F-1	Vicinity Map at maximum scale of 1″ = 2,000′			
F-2	North arrow with datum on north arrow or in title block.			
F-3	Name of Project (Legal Subdivision Name), Drainage Area Map, Election District, County, and State.			
F-4	Maximum scale at 1″=200′ if no ESD devices and 1″=50′ if ESD devices are included.			
F-5	Show existing and proposed contours.			
F-6	Street and stream names.			
F-7	Downstream Analysis included (if applicable)			
F-8	Storm drain computations including pipe size, street spread, inlet capacity, and 50% Blockage Computations (Yard Sump Inlets) provided and sealed by consultant.			
F-9	Show existing and/or approved storm drain facilities.			
F-8	Label off-site ownership with plat or deed reference and zoning.			
F-9	Show proposed drainage divides			
F-10	Note Structure number, drainage area and "C" coefficient in table or for each area on map.			

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G	**STORM DRAIN PROFILE INFORMATION**			
G-1	Use 1″=50 horizontal and 1″= 5′ vertical for pipe profile.			
G-2	Structure numbers to match Plan View, Structure Schedule, and Drainage Area Map.			
G-3	Label "Existing Ground" and "Proposed Grade".			
G-4	Provide for future extension of the storm drain system by ensuring that storm drain is deep enough in ground so that the remainder of the watershed can be drained.			
G-5	A cutoff wall may only be used for a future extension in the same project. An endwall or endsection must be installed at either end of the termination of the storm drain system.			
G-6	Pipes less than 24″ shall be designed for a minimum slope of 1% and pipes 24″ or greater may be designed with a minimumslope of 0.5%.			
G-7	Provide profiles for any pipe system with a size of 12″ or larger.			
G-8	Pipe size may be reduced by one pipe size for the system. Multiple size reductions because of steep slopes is not acceptable.			
G-8	Provide 1 foot minimum cover over top of pipe not the crown for RCP and 2 feet for flexible pipes. Provide note if cover is close to 1 foot plus pavement thickness in street areas to maintain 1 foot cover).			
G-9	A minimum drop of 0.1 foot shall be provided through the structure.			
G-10	Equal crown or greater in structure for incoming and outgoing pipes.			
G-11	For precast inlets, confirm that the entering pipe is deep enough to clear the upper chamber.			
G-12	Field connections are made at the "spring line" and the centerline of the branch pipe shall intersect the centerline of the main line pipe.			
G-13	If vertical clearance between storm drain and any utility is less than 1 foot, contact respective utility company for guidance.			
G-14	Show all utility crossings and maintain 1-foot minimum vertical clearance.			
G-15	Building and/or wall footing shown when adjacent to storm drain. The storm drain should be located outside of the 1:1 zone of influence for the building footing.			
G-16	Indicate location, invert, and structure number of field connection.			
G-17	Water and sewer lines and house connection crossings shown with invert (1 foot minimum clearance, outside to outside).			
G-18	Provide note for pipe stubs to be brick shut.			
G-19	Pipe lengths are shown by stationing at each structure (0+00 at low end).			
G-20	Use Class IV pipe for all pipe located in public right-of-way.			
G-21	Confirm pipe class for cover with table from Appendix 8-?			
G-22	Provide Q10, V10, and Smin for each pipe run and Vact at outfall.			
G-23	Label private or DPW&T maintained sections above profile. Inspection authority limits noted for each profile if more than one for plan.			
G-24	Continuation notes on separated profiles.			

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G-25	Add note for "Four-inch thick granite block bottom" in structure when shaped structure channel exceeds 1.5:1 slope or greater than a 2 foot drop.			
G-26	Pipe anchorage note per SD 100.0 for pipe slope steeper than 20%.			
G-27	Provide fence on endwalls when pipe size exceeds 24". Coordinate with DE to determine if a fence shall be shown when the outfall is in a road ditch. Note DPW&T standard detail SD40.0.			
H	**STORM DRAIN OUTFALLS**			
H-1	Provide rip rap at 0% slope for entire length for all outfalls using charts from 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control with a 5' minimum for downstream end of pipes less than 21' and 10' for pipes 21' or larger.			
H-2	Provide 3 foot deep grouted cutoff wall at end of all Class 1 rip rap.			
H-3	Class II rip rap minimum for 30" outfalls or larger.			
H-4	Extend all pipes to a point where the downstream ground averages is less than 5% excluding the stream channel.			
H-5	Stream outfall slopes greater than 5% require gabions or other material acceptable to PGDPIE, PGDPWT and PGSCD.			
H-6	Provide drop structures so the last pipe reach is 1% or less.			
H-7	Provide rip-rap for all upstream end of pipe or at least 5' for all channels outside of road swales.			
H-8	Show grading of rip rap channel to tie out to existing ground.			
H-9	Show 10-year and 100-year WSEL's.			
H-10	Provide invert, length, slope, and material of outfall stabilization.			
I	**STORM DRAIN HYDRAULIC GRADIENT**			
I-1	Hydraulic gradient shown at crown of pipe or higher for system.			
I-2	Hydraulic gradient to be no higher than 12 inches below the grate elevation or bottom of curb.			
I-3	Determine elevationat terminal structure by inlet and outlet control.			
I-4	Structure loss noted above each structure number.			
I-5	10 and 100-year WSEL elevation(s) noted at headwall or endwall.			
I-6	For open channels, the 10-year WSEL shall be at least 6" below edge of paved shoulder if swale is not being used for ESD devices and 6" from edge of road lane if swale is being used as part of ESD device.			
J	**STORM DRAIN PIPE SCHEDULE**			
J-1	For RCP, only rubber gasket pipe is acceptable.			
J-2	Indicate size, type, class, length, and total length.			
J-3	Note separate public and private pipe lengths.			
K	**STORM DRAIN STRUCTURE SCHEDULE**			
K-1	Indicate type of structure, top of structure, structure width, outgoing pipe invert, and pertinent standard detail number.			
K-2	Note public and private structures.			
K-3	Structure numbers to match those shown on plan, profile, and Drainage Area Map.			
K-4	Top of structure elevation with upper and lower elevations provided, if inlet structure is not at low point.			
K-5	Specify slot opening(s), size, and location (north, south, east, west).			

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K-6	For "B" manholes used as yard inlets, use this note: " Use modified D-1 slab with 6" x 4' opening at N, W, E, or S side(s)" (as appropriate).			
K-7	A minimum of an "A-10" inlet must be specified for street sumps.			
K-8	Verify inlets is wide enough and manhole diameter large enough for all pipes into and out of structure. Manholes must have 6 inches horizontal clearance between precast opening and 12" for masonary structures between each pipe coming in at similar elevations of the structure.			
K-9	Note if structure shall have temporary pipe as part of sediment control or other temporary diversion in order to provide for a structure cutout in precast structure.			
K-10	Only a 15" RCP may enter side of a 2'6" wide A-inlet. Larger width structure must be used for 18" RCP or larger.			
L	**DITCHES AND IMPROVED CHANNELS**			
L-1	Provide typical section(s) specifying bottom width, height, existing ground, side slope, and type of stabilization.			
L-2	Provide slope, channel inverts, and top of bank for channel profile.			
L-3	Provide discharge, velocity (2 and 10 year), and 10-year and 100-year water surface elevations.			
L-4	Provide rip-rap or concrete if channel velocity is greater than 5fps for cut or 4 fps for fill.			
M	**STREAM RESTORATION**			
N	**COORDINATION**			
N-1	Culvert and bridge crossings—Do any culvert and bridge crossings meet national bridge criteria? Contact the Department Office of Project Management at (301) 883-5626 to check these requirements, if applicable. Bridge review/approval by DPW&T Office of Project Management required for all bridgesand box culverts.			
N-2	Transit appurtenances—To ensure that all required transit appurtenances (e.g., shelter, bus stop signs, etc.) are constructed, Permittee should coordinate with the Division of Transit at (301) 883-5656.			
N-3	TRAFFIC CONTROL PLAN - If a Traffic Control Plan is necessary, approval by the Traffic Safety Division is required. Submission of this plan is required through the District Engineer. In some instances, the relevant (typical) traffic control detail(s) may be simply incorporated onto the Storm Drain and Paving Plan. Otherwise, a full Traffic Control Plan is required.			
O	**ASPHALT PAVEMENT SECTION**			
O-1	Pavement sections shall meet or exceed the County standards listed in Section III, specifically Category 100. Thicknesses of pavement section layers may not be less than the standards even if the section yields equal or higher total structural number.	Specs. & Stds for Roadway and Bridges, Section III.		
O-2	All applicable standards of Category 100 shall be depicted on the paving plans. They may be modified with DPIE's approval only.	Specs. & Stds. for R.		
O-3	AASHTO "Guide for Design of Pavement Structures" or other DPIE-approved references can be used if the proposed layers of pavement section are expected to exceed the County standards.	Guide for Des of Pavement Structures.		
O-4	DPIE Soil Reports' evaluations adopted by the developers shall be included on the paving plans for convenience of construction.			

Item #	Design Checklist Item	Reference	CONSULT	DPIE
O-5	DPIE evaluations of Soil Reports provide pavement and subgrade/subbase requirements for the developers' adoption. Alternatives can be proposed by developers for DPIE approval.	Soil Reports Evaluation		
P	**ASPHALT MIX:** Hot Mix (HMA) and Warm Mix (WMA)			
P-1	Asphalt mixes shall be approved by the County, and designed with ESAL Level One (1) unless otherwise allowed by County.	Soil's Report Evaluation		
P-2	Where HMA is specified, WMA can be used if approved by the County, and has a mix design that's identical to the HMA's.	OMT		
P-3	Asphalt mixes shall be produced by County-approved plants only. The County issues a List of Approved Plants annually.	Paving Policy Bullet # 3		
Q	**PAVEMENT SUPPORTING SOILS & SUBBASE STONE**			
Q-1	Subgrade strength shall be evaluated by the California Bearing Ratio (CBR). The County requires a minimum CBR value of 7.	Specs. & Stds. for RW Sec.I		
Q-2	CBR values can typically be improved by applying thicker or stronger stone mixes and/or performing soil modifications that are proposed to and pre-approved by DPIE.	Specs. & Stds. for RW Sec.I		
Q-3	Pavement sections shall NOT be directly supported on unsuitable fill, diatomaceous soils, or high plasticity soils (CH or MH).			
Q-4	For roadways 36 ft or wider, pavements shall be directly supported on at least 6" of compacted CR-6 subbase stone for grading & drainage regardless to subgrade properties. The stone shall be hydraulically connected to required underdrains/ditches			
Q-5	For roadways 26 ft wide or narrower, waiver of the required subbase stone may be considered by DPIE if cement stabilization of their subgrade is proposed to and pre-approved by DPIE.			
Q-6	For roadways with deeply weak spots (impractical to be fully removed & replaced), at least 12" of surge stone (#2 choked with #57) shall be used for bridging over instead of the subbase stone, unless other methods are proposed to & pre-approved by DPIE.			
Q-7	Recycled materials (like RC-6) are not acceptable for permanent applications in the public right-of-way, except in asphalt mixes.			
R	**PAVEMENT DRAINAGE**			
R-1	Pavement section shall be at least 2 ft above groundwater table to prevent capillary action that results in loss of stability and possible frost damage. See Chapter 3, A.7 (page 37).	Specs. & Stds. for RW Sec.I	DPW&T	
R-2	PVC or HDPE underdrains shall be installed per DPW&T Standrads 300.13 ~ 300.17 unless otherwise approved by DPIE.	Specs. & Stds. RW Sec. III	DPW&T	
R-3	On residential roads, the need for underdrains is affected by many factors including: groundwater table; type, permeability & moisture of soils; sump-pump discharge; topography or site terrain around the road; possible drainage & seepage from the surroundings towards the road; spread of Clay pockets or shallow hardpan on which water may accumulate unless intercepted by underdrains; among other factors. One single factor of the above can be sufficient for County to require placement of underdrains regardless of all other factors.			
R-4	On rural roadways and where waived on urban roadways, underdrains shall still be installed at: low-laying areas (extending from the stormdrain inlet to 25 ft on each side of it) and where deemed necessary by DPIE Inspectors.			
R-5	Underdrains shall drain into the nearest stormdrain inlet if present or into suitable, protected outfall if no stormdrain exists.			

Item #	Design Checklist Item	Reference	CONSULT	DPIE
R-6	Extent of underdrains must be defined in paving notes on plans.	Specs. & Stds. for RW Sec.I	DPW&T	
R-7	Depth of underdrains varies but is generally 2 to 6 ft. It has to be 4.5 ft to avoid tree roots if placed between curb and sidewalk.			